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Technical Reports

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NEWSLETTER IN CENTER FOLD

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UNITED STATES DEPARTMENT OF COMMERCE

Charles Sawyer, Secretary

OFFICE OF TECHNICAL SERVICES

John C. Green, Director

May 1951

PRINCETON UNIVERSITY
PLASTICS LABORATORY

The research of the Princeton Plastics Laboratory is sponsored jointly by the Army, Navy and Air Force, originally under Signal Corps Contract W-36-039-sc-32011 from 1946 to 1950 and presently under similar contract DA-36-039-sc-133. The field of this research in polymer science and engineering is so broad that it has been possible to integrate this with Princeton's unique graduate engineering curriculum in plastics, thus supplementing the instructional program while performing a service to the government.

The research has been performed by a staff composed of faculty, graduate students and full-time research personnel comprising a mechanical group, an electrical group, an applied chemistry group and a theoretical polymer group, variously training mechanical, electrical and chemical engineers and chemists in all aspects of polymeric materials. While the results may be classified under theory, methods, or materials, an easier classification is suggested by the efforts of the separate groups.

Mechanical Section

This group is engaged in rheological studies. These have led to a new method of impact testing which eliminates the "toss-factor" error in the standard method of test. This new method which permits impact testing over a wide range of strain rates has been so applied, at various temperatures to correlate these variables. In addition this group has made an extensive study of crazing and offers a theory to explain the mechanism of this type of failure, together with various observed causes of crazing. More recent studies involved the measurement of the elastic constants of plastics in torsion and the measurements of internal viscosity by dynamic studies. The Technical Reports from this group are as follows:

11 B	21 Sept. 1948	The Rheological Properties of Polystyrene Below 80°C by B. Maxwell and L. F. Rahm (PB 99436)
12 A	10 Dec. 1948	Determination of the Cure of Molded Plastics by J.N. McDonald; H.B. Robinson, L. F. Rahm (PB 97564)
12 C	20 Dec. 1948	Impact Testing of Plastics; Elimination of Toss Factor by B. Maxwell and L. F. Rahm (PB 97570)
14 B	5 May 1949	Factors Affecting the Crazing of Polystyrene by B. Maxwell and L. F. Rahm (PB 99438)
18 D	20 July 1950	Mechanical Properties of Oriented Polystyrene by B. Maxwell
19 A	25 Nov. 1950	The Effect of Velocity on the Tensile Impact Properties of Methyl Methacrylate by B. Maxwell and J. P. Harrington

Electrical Section

This group is concerned with arc resistance studies of plastics both in regard to methods and with reference to the molecular structure and chemical composition of the materials. A second major interest of the group concerns dielectric measurement of plastics over a frequency range of 50c - 50,000 mc both in the matter of measurement methods and in the application of microwave techniques to the study of these materials. The Technical Reports from this group are:

13 B	11 Mar. 1949	Ferromagnetic Resonance in Iron Oxides by G. E. Crouch, Jr. and C. H. Willis (PB 99295)
13 C	28 Mar. 1949	Dielectric Measurement Methods for Solids at Microwave Frequencies by W. H. Surber, Jr. and G. E. Crouch, Jr. (PB 99216)
15 A	29 July 1949	An Empirical Minimum Dielectric Loss Relationship by G. E. Crouch, Jr. (PB 103115)
18 G	14 July 1950	An Investigation of Arc Resistance by M. Olyphant, Jr. and C. H. Willis

Materials Section

This group is primarily concerned with the new or improved materials required by the services and has produced five superior laminates, four new molding compounds and a polyurethane potting compound. Research on the latter is still in progress as well as studies in high K - low loss materials and low K - low loss materials. The Technical Reports of this group follow:

14 C	12 May 1949	Low-Loss, Arc Resistant Paper Laminates by R. Lurie and N. Vasileff (PB 99220)
14 D	15 June 1949	Castor Oil Polyurethanes and Applications as Potting Compounds by B. H. Carr and N. Vasileff (PB 99168)
15 B	4 Aug. 1949	Dielectric Properties of Binary Liquid Mixtures by R. S. Mallouk and N. Vasileff
16 B	6 Dec. 1949	Guanamine-Formaldehyde Resins and Laminates by P. J. Boeke, J. Willoch, and N. Vasileff
18 B	22 June 1950	Low K. Low-Loss, High Arc Resistance Silicone Molding Compound by T. Zawadzki and N. Vasileff
18 C	14 July 1950	Improved Glass Cloth Arc Resistant Laminates by A. L. Alesi, P. J. Boeke, N. Vasileff
18 E	14 July 1950	Amines as Silicone Catalysts by N. Vasileff
18 F	26 June 1950	Low-loss, High Arc Resistance Guanamine Molding Compounds by J. Willoch, N. Vasileff

High Polymer Section

This group was concerned with the fundamental principles involved in the synthesis of a superior mechanical-electrical plastic and new or improved potting compounds. The theoretical work involved relaxation and birefringence studies and methods of polymerization, preparation and properties of various polymers and copolymers. The following Technical Reports indicate the scope of this work:

11 A	10 Sept. 1948	The Preparation and Vulcanization of Liquid Polyisoprene Polymers by Y. Conwell, G. P. Roeser, A. V. Tobolsky (PB 99435)
12 B	15 Dec. 1948	Crazing of Polystyrene Film by J. R. McLoughlin (PB 97572)
14 A	3 May 1949	Monoradical and Diradical Polymerization of Styrene by D. H. Johnson, A. Escoruela, and A. V. Tobolsky (PB 99437)
15 C	20 Sept. 1949	The Fractionation of Liquid Polyisoprene Polymers by Y. Conwell and A. V. Tobolsky
16 A	22 Dec. 1949	Calculation of Bulk Viscosity of Polyisobutylene from Stress Relaxation Data by R. D. Andrews and A. V. Tobolsky

17 A	15 Mar. 1950	Formation of Low Molecular Weight Polymers Using Chain Transfer Agents: Part I Theory by R. C. Fettes, D. H. Johnson, and A.V. Tobolsky
17 B	22 Mar. 1950	Isoprene-Acrylonitrile Copolymers by Y. Conwell and A. V. Tobolsky
18 A	1 June 1950	Studies of the Structure and Properties of Polymers by the Use of Birefringence by R. S. Stein and A. V. Tobolsky

In addition to the reports listed above, the research from January 1946 to July 1948 was reported in the form of "continuing quarterly technical reports". Thus reports 1 - 10 are each in effect the combined technical reports of the separate research groups for the quarter involved. These proved to be awkward for reference purposes and beginning with Quarterly Status Report 11, October 1, 1948 this and subsequent Quarterly Reports are identified by plain numbers which Technical Reports of the same quarter are identified by the same number with letter suffix to denote the particular report.

Submitted by:
Louis F. Rahm

APPAREL

LA PLONGEE EN SCAPHANDRE (DIVING BY DIVING SUIT), by P. Tailliez, F. Dumas, J. Y. Cousteau, J. Alinat, Dr. F. DeVilla. Nov 1950. 19p drawings, tables Mi $1.75, Ph $2.50. PB 102937

1. Diving equipment - France 2. Clothing, Diving - France 3. NAVSHIPS T393.

Translation of pages 26-36, 103-108 by F. Rizzo.

REPORT ON THE DEVELOPMENT OF PROTECTIVE CLOTHING FOR HANDLING LIQUID ROCK PROPELLANTS, by Eugene T. Hagan. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1950. 11p photos Mi $1.75, Ph $2.50. PB 102924

1. Clothing, Protective - Tests 2. AAF TSEAA MR 666-16K.

SUIT, FLYING, PNEUMATIC, ANTI G, TYPE G-4A, MANUFACTURED BY THE BERGER BROTHERS COMPANY, NEW HAVEN, CONNECTICUT, by E. E. Martin. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1951. 3p Mi $1.25, Ph $1.25. PB 103005

1. Suits, Flying - Pneumatic - Tests 2. Anti G, type G-4A (Flying suit) 3. G-4A (Flying suit) 4. AAF TSEAA MR 689-4J.

Specification MIL-S-6455. See also PB 103004.

SUIT, FLYING, PNEUMATIC, ANTI G, TYPE G-4A, MANUFACTURED BY THE DAVID CLARK COMPANY, WORCESTER, MASSACHUSETTS, by E. E. Martin. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1951. 3p Mi $1.25, Ph $1.25. PB 103004

1. Suits, Flying - Pneumatic - Tests 2. Anti G, type G-4A (Flying suit) 3. G-4A (Flying suit) 4. AAF TSEAA MR 689-4H.

Specification MIL-S-6455. See also PB 103005.

CHEMICAL AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

DEVELOPMENT OF COMMERCIAL PROCESS FOR AND PREPARATION OF 4,7-DICHLOROQUINOLINE, BY WESLEY L. MINNIS. FINAL REPORT OSRD CONTRACT OEMCMR-488 WITH NATIONAL ANILINE DIVISION, ALLIED CHEMICAL AND DYE CORPORATION. U. S. Office of Scientific Research and Development Committee on Medical Research. Board for Coordination of Malarial Studies. Jun 1946. 142p diagrs Mi $5.75, Ph $18.75. PB 102809

During the present report period, a total of 4000 pounds of 4,7-dichloroquinoline was made in plant equipment using the ethoxymethylene-malonic ester (EMME) process. This product ion involved the manufacture of 11,450 pounds of EMME and 9900 pounds of 7-chloro-4-hydroxy-3-quinolinecarboxylic acid as intermediates. A portion of this 4,7-dichloroquinoline was converted to 1146-1/2 pounds of SN 7618-5 and a portion to 235 pounds of SN 8137-5. With the exception of the preparation of EMME, the manufacture of the 4,7-dichloroquinoline was carried out directly in large scale plant equipment on the basis of experience gained in the previous small scale production made in 1944. Conditions used in this small production for manufacturing EMME had been unsatisfactory, and the process was modified by laboratory work here and at the University of Illinois and was again operated in small scale equipment before going to large scale. Processes for SN 7618-5 and SN 8137-5 were developed in the laboratory from information supplied by the University of Maryland laboratories, and the former was then prepared in large scale plant equipment and the latter in small scale equipment. An investigation was carried out of laboratory processes for 4,7-dichloroquinoline alternate to the EMME process. This work was centered on the amidine modification of the EMME process and, with less detail, on preparation from oxaloacetic ester. The amidine process was found to have the most promise for economical manufacture of 4,7-dichloroquinoline. The oxaloacetic ester process suffers from the large amount of 5-chloro-4-hydroxy-2-quinolinecarboxylic acid ethyl ester formed with the desired 7-chloro isomer on ring closure of the intermediate, ethyl beta-carbethoxy-beta-(m-chloroanilino) acrylate.

EFFECTIVENESS OF VARIOUS DRUGS IN PREVENTION OF AIRSICKNESS II: COMPARISON OF HYOSCINE WITH BENADRYL-HYOSCINE MIXTURE DURING NAVIGATION TRAINING FLIGHTS, by Herman I. Chinn and Benjamin A. Strickland, Jr. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Dec 1950. 4p tables Mi $1.25, Ph $1.25. PB 102824

This report discusses under actual flying conditions, the effectiveness against airsickness and the incidence of side effects of a mixture containing reduced amounts of hyoscine and Benadryl compared with the customary dosage of hyoscine alone. Formerly project no. 21-02-169. For Reports no. 3-4 see PB 102574 and PB 102700. AAF SAM Proj 21-32-014, Report no. 2.

Dyes

AKO REPORT ON WORK DONE IN AZO LABORATORY. PAPERS READ AT 14TH SCIENTIFIC AKO (AZO COMMISSION) MEETING HELD AT OFFENBACH ON MAY 5, 1939. I. G. Farbenindustrie A. G., Wolfen, Ger. May 1939. 88f photos Mi $3.75, Enl Pr $12.50. PB 102947

1. Dyes and dyeing - Research - Germany 2. Micro BIOS FD 305/50 frames unnumbered 3. Micro BIOS FD 306/50, frames unnumbered 4. Micro BIOS FD 307/50, frames unnumbered 5. Micro BIOS FD 308/50, frames unnumbered 6. Micro BIOS FD 309/50, frames unnumbered.

English abstract available as PB 102947s. 12p. Mi $1.75, Ph $2.50.

SORPTION OF DYES BY HALLOYSITE, by Clyde Orr, Jr. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Sep 1950. 12p diagrs, graphs Mi $1.75, Ph $2.50. PB 102812

The surfaces of finely divided particles of the clay mineral halloysite sorb dyes by both ion exchange and physical adsorption. The surface occupied by dye ions and molecules as determined by BET measurement is given, and an interpretation in terms of dye structure and the sorption isotherm is offered. The results suggest a simple method for measuring the surface area of halloysite particles. Project no. 143-68, Special report no. 1. Contract no. W36-039-sc-38258. Department of the Army Project: 3-99-15-022. Signal Corps Project: 32-152B-O.

Detergents

WATER VAPOR SORPTION BY ALUMINUM SOAPS, by John Howard Gross. Jan 1949. 146f photos, graphs, tables Mi $5.75, Enl Pr $20.00. PB 103198

An investigation was made of the sorption characteristics of aluminum soaps throughout the full range of relative pressures of water vapor. Four water vapor sorption isotherms were taken on each of the six samples of soaps made from lauric, stearic, caprylic, and 2-ethyl hexoic acids. Three of the samples consisted of aluminum laurates made with different amounts of excess sodium hydroxide in the soda soap preparation. One laurate contained a large amount of free lauric acid which distilled from the sample at zero relative pressure. The other samples have lesser amounts of volatile impurity. The isotherms are of the sigmoid type and have a hysteresis loop extending to lowest relative pressures. The significance of the behavior of soaps in water vapor sorption is discussed. The data obtained during the investigation were used to measure surface area and heat of sorption for some of the soaps. Thesis-Rensselaer Polytechnic Institute.

Agricultural Chemicals

CANKERWORMS AS TEST INSECTS FOR DDT; FIELD TESTS OF MODELS OF THE HOCHBERG-LAMER INSECTICIDAL AEROSOL GENERATOR AT HEMPSTEAD LAKE STATE PARK, LONG ISLAND, N. Y., BY VICTOR K. LA MER, SEYMORE HOCHBERG, J. Q. UMBERGER, JOSEPH BETHEIL OF THE CENTRAL AEROSOL LABORATORIES, COLUMBIA UNIVERSITY. U. S. National Defense Research Committee. Sep 1945. 11p photos Mi $1.75, Ph $2.50. PB 103013

1. Hochberg-LaMer insecticidal aerosol generator (Trade name) 2. DDT - Tests 3. Insects - Effects of DDT 4. OSRD 6004.

NRC Insect Control Committee no. 124. Progress report under Contract 10-505 OEMsr-1388.

EFFECT OF SOLVENTS ON THE TOXICITY OF DDT AEROSOLS, by Victor K. LaMer, S. Hochberg, H. Lauterbach, I. Johnson, Randall Latta, L.D. Anderson and E. E. Rogers. U. S. National Defense Research Committee and U. S. Office of Scientific Research and Development. Committee on Medical Research. Aug 1945. 17p drawing, graphs, table Mi $1.75, Ph $2.50. PB 103012

The results show that an aerosol consisting of DDT dissolved in a non-volatile solvent is more effective in killing adult mosquitoes than an aerosol obtained from DDT dissolved in a volatile solvent. The character of the solvent is immaterial providing it is sufficiently non-volatile. Attention is directed to the finding that homogeneity of particle size is not necessary for testing for large particle sizes and/or high wind velocities. A simplified technique is possible under those conditions. NRC Insect Control Committee 123. Interim report C-33. OSRD 5936.

Plastics and Plasticizers

LINEARIZED SOLUTION AND GENERAL PLASTIC BEHAVIOR OF THIN PLATE WITH CIRCULAR HOLE IN STRAIN-HARDENING RANGE, by M. H. Lee Wu. U. S. National Advisory Committee for Aeronautics. Mar 1951. 41p graphs, tables Mi $2.50, Ph $6.25. PB 103049

A linearized solution of plastic deformation in a thin plate with a circular hole is obtained and used to investigate general plastic behavior in such a plate. An approximate method is also given. Principal stress-strain distributions are obtained with these two methods by a simple multiplication and agree very well with the exact solution obtained previously. Results show that (1) a simple general criterion of applicability of deformation theory based on tensile stress-strain curves is obtained; (2) the ratio of strain along the radius to the maximum value and the ratio of principal stresses are essentially independent of material, but the stress distributions depend on the material; and (3) the approximation employing ideally plastic material gives good results for strains. NACA TN 2301.

LOSS FACTOR OF FORMVAR, by T. D. Callinan. U. S. Naval Research Laboratory. Apr 1948. 24p drawings, graphs, tables Mi $2.00, Ph $3.75. PB 103030

The loss factor of a dielectric is shown to be applicable to four discrete concepts of phenomena: the measure of power loss in the dielectric, a component of a complex dielectric constant, the effect arising from mixtures of materials with different time constants, and a measure of activation of energy. Each of these is studied in turn and the relationships applied to Formvar insulation. NRL C-3275.

STRENGTH OF HEAT-RESISTANT LAMINATES UP TO 375°C, by B. M. Axilrod and Martha A. Sherman. U. S. National Advisory Committee for Aeronautics. Feb 1951. 53p photos, graphs, tables Mi $2.75, Ph $7.50. PB 102963

The flexural properties of samples of glass-fabric laminates were determined for several conditions of heating and testing. The laminates tested were bonded with various resins, including unsaturated-polyester, acrylic, silicone, phenolic, and melamine types. Flexural tests were made under the following conditions: (1) At 25°C and 50-percent relative humidity after 200 hours' heating at a temperature T (150°, 200°, and 250° C); (2) at a temperature T (150°, 200°, 250°, 300°, and 375° C) after heating 0.5 hour at the temperature T; (3) at a temperature T (150°, 200°, 250°, and 325° C) after heating 200 hours at the temperature T; and (4) at 25° C and 50-percent relative humidity without heating prior to testing. NACA TN 2266.

THERMAL EVALUATION OF FORMVAR RESIN, by J. Robert Bukey. U. S. Naval Research Laboratory. Jul 1946. 21p photos, graphs Mi $2.00, Ph $3.75. PB 103102

The purpose of this work is to develop a method of evaluating electrical insulating materials with the end in view of being able to predict the life of an insulation when operated at a given temperature. The method described herein involves the determination of the electrical properties of Formvar resin at various temperatures after aging under special conditions. Numerous plots of data are given to illustrate the use of the method on magnet wire. For 2d report see PB 103103. See also PB 100862, PB 103030 for other reports on Formvar. NRL P-2915.

THERMAL EVALUATION OF FORMVAR RESIN, SECOND REPORT, by Thomas D. Callinan. U. S. Naval Research Laboratory. Oct 1947. 16p graphs, tables Mi $1.75, Ph $2.50. PB 103101

The purpose of this work is to develop a method of evaluating electrical insulating materials with the end in view of being able to predict the life of an insulation when operated at a given temperature. The method described herein involves the determination of the electrical properties of Formvar Resin at various temperatures after aging under special conditions. Numerous plots of data are given to illustrate the changes in electrical properties which Formvar Resin undergoes with time. For 1st report see PB 103102. See also PB 100862 and 103030 for other reports on Formvar. Problem 32 Co6-11. NRL C-3191.

Paints, Varnishes and Lacquers

HEAT RESISTING AIRCRAFT FINISH, EVALUATION OF, by R. E. Clements. U. S. Naval Air Material Center. Aeronautical Materials Laboratory, Philadelphia, Pa. Sep 1949. 8f Mi $1.25, Enl Pr $2.50. PB 103188

A service evaluation of heat-resistant jet-aircraft finish coatings was made. Eight experimental coatings, i.e., five NAES silicone formulations, an NAES baking melamine formaldehyde-alkyd enamel, a U of L silicone, and a Midland Co. silicone, were applied in stripes over the starboard engine cowling and the fuselage adjacent to the jet exhausts of a XF2H-1 fighter. The test results obtained after three hours engine run on the ground and two hours in flight are shown in tabular form. Further work is outlined for the preparation of a specification based on the most suitable silicone formulation. NAM AML 434330 pt. 2.

IMPROVED TOPCOAT FOR USE ON NAVAL AIRCRAFT, DEVELOPMENT OF. REPORT by I. Shapiro. U. S. Naval Air Material Center. Aeronautical Materials Laboratory, Philadelphia, Pa. Aug 1949. 13f table Mi $1.75, Enl Pr $3.75. PB 102995

Tests were made of pigmented nitrocellulose-modified methacrylate and vinyl chloride-vinyl acetate copolymer-modified methacrylate to determine their suitability for use as topcoats on the exterior metal surfaces of naval aircraft. Tests consisted of determining working properties, primer absorption, coating anchorage, flexibility, cold cracking, water resistance, hydrocarbon resistance, and abrasion resistance. Glossy sea blue topcoats were applied without primer to anodized 24ST aluminum alloy panels for Florida land exposures. The results showed that there is no available primer coat suitable for use under these topcoats. NAM AML 424334.

Chemical Engineering and Equipment

FLOW SHEETS RELATING TO THE BUTYL ALCOHOL AND METHANOL SYNTHESIS. OPERATIONAL DETAILS OF THE CRACKING OF METHANE. I. G. Farbenindustrie A. G., Oppau, Ger. 1940-1944. 45f drawings, graphs (Text in German) Mi $2.50, Enl Pr $7.50. PB 102951

1. Butyl alcohol - Synthesis - Germany 2. Isobutyl alcohol - Synthesis - Germany 3. Methane - Cracking - Germany 4. Micro BIOS FD 276/50, Frames 1-29.

English abstract included. Abstract available as PB 102951s. 1p. Mi $1.25, Ph $1.25.

PRODUCTION AND COST SHEETS RELATING TO METHANE AND METHYLENE CHLORIDE AND ACETIC ACID, FLOW DIAGRAMS; QUESTIONNAIRES AND ANSWERS ON ACETIC ACID, METHYL CHLORIDE, METHYLENE CHLORIDE, CHLOROFORM, AND CARBON TETRACHLORIDE. I. G. Farbenindustrie A. G., Höchst, Ger. 1938-1945. 83f drawings, tables (Text in German and English) Mi $3.75, Enl Pr $12.50. PB 103099

1. Acetic acid - Production - Germany 2. Carbon tetrachloride - Production - Germany 3. Chloroform - Production - Germany 4. Methane - Production - Germany 5. Methane, Chloro - Production - Germany 6. Methane, Dichloro - Production - Germany 7. Micro BIOS FD 5386/47, Frames 1-78,

Abstract available as PB 103099s. 2p. Mi $1.25, Ph $1.25.

ROTARY DISTILLATION COLUMN AND OTHER DISTILLATION EQUIPMENT. Badische Anilin und Soda Fabrik, Ludwigshafen, Ger. 1926-1947. 33f drawings (Text in German) Mi $2.25, Enl Pr $6.25. PB 102949

1. Distillation - Apparatus - Germany 2. Methanol - Distillation - Germany 3. Micro BIOS FD 1367/49, Frames 1-9+21.

Miscellaneous Chemicals

DETERMINATION OF IMPURITIES IN INERT GASES, by R. E. Bowman and C. B. Hartley. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1949. 15f diagrs, graph Mi $1.75, Enl Pr $3.75. PB 103195

A method was developed for determining the total impurities in the inert gases argon and helium, based on the fact that molten lithium absorbs nitrogen, oxygen, and water vapor. The impurities were removed from the gas sample which is placed in a constant volume apparatus. The purity of the gas was determined from the change in pressure at a standard temperature, which is produced by removal of the impurities. Since the total impurities in argon for welding were less than 0.2%, a special apparatus was constructed to minimize errors due to small changes in atmospheric pressure and temperature. AAF TR 5931.

PASCHEN-BACK EFFECT IN NH_3 AND N_2O MICROWAVE SPECTRA, by C. K. Jen. Harvard University. Cruft Laboratory, Cambridge, Mass. Jul 1949. 27f photos, graph Mi $2.00, Enl Pr $5.00. PB 103197

The Paschen-Back effect in the microwave spectra of ammonia and nitrous oxide was investigated with a resonant-cavity spectroscope. Results for $N^{14}H_3$, representing a case of one-nuclear (N^{14}) coupling, show the effects of gradual decoupling of the nuclear spin from molecular rotation. Decoupling was not quite complete in a field of 10,000 oersteds. Results for $.N^{14}N^{14}O^{16}$, representing a case of two-nuclear (N^{14}, N^{14}) coupling, show that the decoupling is almost complete at a field of 10,000 oersteds. Contract N5ori-76. HU CL TR 85.

PHYSICAL CHEMICAL APPROACH TO REACTION KINETICS, by Joseph O. Hirschfelder and Charles A. Boyd. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Sep 1949. 36p diagrs, graph Mi $2.25, Ph $5.00. PB 103026

Physical chemical principles and methods are described which can be used to investigate the kinetics of a chemical reaction and to determine the optimum operating conditions for producing the most efficient yield of the product. After the mechanism of the reaction has been determined, the theory of absolute reaction rates is applied. The effect and choice of the catalyst for use with a reaction are discussed. University of Wisconsin CM-563 under Contract NOrd 9938, Task Wis-1.

PRODUCTION OF 2-AMINO PYRIMIDINE. I. G. Farbenindustrie A. G., Höchst, Ger. 1947. 2f Mi $1.25, Enl Pr $1.50. PB 102954

1. Pyrimidine, 2-Amino - Production - Germany
2. Propiolaldehyde - Preparation - Germany
3. Micro BIOS FD 1410/49, Frame 1.

Abstract included. Abstract available as PB 102954s. 1p. Mi $1.25, Ph $1.25.

SUMMARY TABLES OF BIOLOGICAL TESTS, VOLUME 2, NO. 6, P. 311-375. U. S. National Research Council. Chemical-Biological Coordination Center. Dec 1950. 71p Mi $3.50, Ph $10.00. PB 102926

1. Biological chemistry - Tests.

THEORETICAL ORGANIC CHEMISTRY, PART II. (AMERICAN FIAT REVIEW OF GERMAN SCIENCE 1939-1946, V. 35) TRANSLATED, EDITED, AND PUBLISHED IN COOPERATION WITH THE OFFICE OF TECHNICAL SERVICES, DEPT. OF COMMERCE, BY THE O. W. LEIBIGER RESEARCH LABORATORIES, INC., by Walter Hückel and others. Nov 1950. 230p Available from O. W. Leibiger Research Laboratories, Inc., Petersburg, N. Y. $5.30. PB 85025t

ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES

Communication Equipment

ABSORPTION OF MICROWAVES BY GASES AT HIGH PRESSURE, by I. R. Weingarten. Columbia University. Columbia Radiation Laboratory, New York, N. Y. May 1948. 59p drawings, diagrs, graphs Mi $2.75, Ph $7.50. PB 102822

1. Bolometers 2. Radio waves - Absorption
3. SIG Contract W-039-sc-32003.

ANALYSIS AND PREDICTION OF SKY-WAVE FIELD INTENSITIES IN THE HIGH FREQUENCY BAND, by Paul O. Laitinen and George W. Haydon, U. S. Signal Corps. Radio Propagation Unit. Baltimore Signal Depot, Baltimore, Md. Aug 1950. 130p diagrs, graphs, tables Mi $5.00, Ph $16.25. PB 103045

The purpose of this report is to present an engineering method of evaluation sky-wave field intensities in the high frequency band for any transmission distance up to about 15,000 kilometers. Field intensity recordings were statistically analyzed in order to study daytime absorption, day-to-day variations, and absolute magnitudes. Based upon the analysis, a proposed prediction method was obtained which should give relatively accurate sky-wave field intensities for the frequencies and distances considered. Succeeding sections show the method of analysis of absorption, the method of analysis of absolute magnitudes, the method of analysis of day-to-day variations, the proposed field intensity prediction method, and summarizing conclusions. All necessary equations used in the prediction method are represented in nomograms. SIG RPU TR9. SIG RPU 203.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT SEP. 1, 1946 TO NOV 1, 1946 ON CONTRACT W-33-038-AC-15445, by Paul B. Black. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Nov 1946. 20p drawings, graphs Mi $1.75, Ph $2.50. PB 103150

1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.

Report AD-AL-2.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT FOR JAN 1, 1947 TO MAR 1, 1947 ON CONTRACT W-33-038-AC-15445, by Paul B. Black. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Mar 1947. 9f diagr, graph, tables Mi $1.25, Enl Pr $2.50. PB 102753

1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.

Report no. AD-AL-4.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT MAR 1, 1947 TO MAY 1, 1947 ON CONTRACT W-33-038-AC-15445, by P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. May 1947. 20p graphs, table Mi $1.75, Ph $2.50. PB 10315'

1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.

Report AD-AL-5.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT, MAY 1, 1947 TO JUL 1, 1947 ON CONTRACT W-33-038-AC-15445, by P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Jul 1947. 19p diagrs, graphs Mi $1.75, Ph $2.50. PB 103152

1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-6.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT, JUL 1, 1947 TO SEP 1, 1947 ON CONTRACT W-33-038-AC-15445, by Paul B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Sep 1947. 15p graphs, tables Mi $1.75, Ph $2.50. PB 103153
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-7.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT, SEP 1, 1947 TO NOV 1, 1947 ON CONTRACT W-33-038-AC-15445, by P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Nov 1947. 11p diagr, tables Mi $1.75, Ph $2.50. PB 103154
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-8.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT NOV 1, 1947 TO JAN 1, 1948 ON CONTRACT W-33-038-AC-15445, by P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Jan 1948. 11p tables Mi $1.75, Ph $2.50. PB 103155
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-9.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT, JAN 1, 1948 TO MAR 1, 1948 ON CONTRACT W-33-038-AC-15445, by P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Mar 1948. 18p graphs Mi $1.75, Ph $2.50. PB 103156
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-10.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT MAR 1, 1948 TO MAY 1, 1948 ON CONTRACT W-33-038-AC-15441, by P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. May 1948. 21p graphs Mi $2.00, Ph $3.75. PB 103157
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-11.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT FOR MAY 1, 1948 TO JULY 1, 1948 ON CONTRACT W-33-038-AC-15441, by A. L. Dolnick, P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Jul 1948. 12p photo, diagr, tables Mi $1.75, Ph $2.50. PB 103158
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-12.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. INTERIM ENGINEERING REPORT JULY 1, 1948-SEPT. 1, 1948, CONTRACT W-33-038-AC-15441. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Sep 1948. 6f Mi $1.25, Enl Pr $2.50. PB 102755
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.
Report AD-AL-13.

DEVELOPMENT OF MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST RF PRE-AMPLIFIER. TERMINAL ENGINEERING REPORT ON CONTRACT W-33-038-AC-15441. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Dec 1948. 34f drawings, diagrs, tables Mi $2.25, Enl Pr $6.25. PB 102758
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.

MICROWAVE AMPLIFIER TUBES AND ASSOCIATED TEST R.F. PRE-AMPLIFIER. TERMINAL ENGINEERING REPORT ON CONTRACT W-33-038-AC-15441, by A. L. Dolnick, P. B. Black and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Dec 1948. PB 103166
1. Amplifiers, Radio frequency (RF) 2. Tubes, Amplifier.

Electronics

COMPACT BROADBAND MICROWAVE QUARTER-WAVE PLATE, by A. J. Simmons. U. S. Naval Research Laboratory. Oct 1950. 14p photo, diagrs, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.50. PB 102838

A method is described for systematic design of waveguide sections containing a reflectionless array of phase-shifting capacitive pins. The method is applied to the design of a short, 3-element quarter-wave plate. A method is presented for broadbanding by assuming a certain variation of the pin susceptance with frequency. Experimental measurements on a quarter-wave section in circular waveguide give the predicted broadband circular polarization. NRL R 3748.

DEVELOPMENT OF A RELAY, ALTERNATING CURRENT, 400 CPS, MINIATURE, HERMETICALLY SEALED TO WITHSTAND SEVERE SERVICE CONDITIONS. FINAL ENGINEERING REPORT ON CONTRACT NO. W-33-038-AC-14720 WITH SIGMA INSTRUMENTS INC., by Merritt A. Rudner. U. S. Air Materiel Command. Engineering Division Components and Systems Laboratory. Electronics Sub-Division. Jul 1949. 112p diagrs, graphs Mi $4.75, Ph $15.00. PB 102909

The development, construction, and test of a miniature hermetically sealed variable-frequency a-c relay is discussed with respect to its design requirements and capabilities. It has been possible to produce a relay which will operate satisfactorily on 110 v, 400 cycles a-c input, consume less than 2 w, and properly switch 2 amp at 35 DC or 2 amp at 115 AC, while at the same time meeting shock, vibration and temperature requirements of airborne equipment.

It was recommended in general that before mass production of the relays be started further design consideration be given to the armature and core alignment, ease of adjustment of stationary contacts, and the headers employed. Sigma Instruments, Inc. Report no. 17. TSELRES MR 49-33.

DEVELOPMENT REPORT ON SUBMINIATURE R.F. PENTODE AND H. F. TWIN TRIODE, PERIOD NOV. 1-DEC. 1, 1947. CONTRACT W-33-038-AC-18166. GENERAL ELECTRIC CO., SCHENECTADY, N. Y. REPORT SUBMINIATURE W.F. 1. Dec 1947. 4f Mi $1.25, Enl Pr $2.50. PB 102771

1. Vacuum tubes, Pentode - Research 2. Vacuum tubes, Triode - Research 3. Vacuum tubes, Miniature - Research.

For 6th report see PB 102772; for 12th report see PB 102773.

DEVELOPMENT REPORT ON SUBMINIATURE R.F. PENTODE Z1723, R. F. TWIN TRIODE Z1724. PROGRESS REPORT NO. 6 FOR CALENDAR MONTH OF APRIL 1948 ON CONTRACT W-33-038-AC-18166, by W. T. Millis. General Electric Co., Schenectady, N. Y. Apr 1948. 11p drawing, tables Mi $1.75, Enl Pr $3.75. PB 102772

1. Z1723 (Vacuum tube) 2. Z1274 (Vacuum tube) 3. Vacuum tubes, Pentode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Miniature - Research.

For 1st report see PB 102771; for 12th report see PB 102773.

DEVELOPMENT REPORT ON SUBMINIATURE Z-1723 R.F. PENTODE AND Z-1724 H.F. TWIN TRIODE. PROGRESS REPORT NO. 12 ON CONTRACT W33-038-AC-18166 FOR PERIOD DEC 1948 AND JAN 1949, by W. T. Millis. General Electric Co., Owensboro, Ky. Jan 1949. 37f photos, graph, tables Mi $2.25, Enl Pr $6.25. PB 102773

1. Z-1723 (Vacuum tube) 2. Z-1724 (Vacuum tube) 3. Vacuum tubes, Pentode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Miniature - Research.

For 1st report see PB 102771; for 6th report see PB 102772.

ELECTRON TUBE RESEARCH AND DEVELOPMENT: SUBMINIATURE VERSIONS OF RMA TYPES 6L6, 6AG7, AND ONE-HALF OF 6AS7G. FOURTH INTERIM ENGINEERING REPORT, PERIOD 1 JAN-28 FEB 1950, ON CONTRACT AF 33 (038)-5734, by George Freeman, Donald O. Holland, Joseph S. Harvey. Raytheon Manufacturing Co., Newton, Mass. Mar 1950. 9f Mi $1.25, Enl Pr $2.50. PB 102774

1. Tubes, Electron - Research 2. Vacuum tubes, Miniature - Research.

Report 1041-4. For 5th-6th reports see PB 102775-102776.

ELECTRON TUBE RESEARCH AND DEVELOPMENT: SUBMINIATURE VERSIONS OF RMA TYPES 6L6, 6AG7, AND ONE-HALF OF 6AS7. FIFTH INTERIM ENGINEERING REPORT, PERIOD 1 MAR TO 30 APR 1950, CONTRACT NO. AF 33(038)-5734, by George Freedman and D. O. Holland. Raytheon Manufacturing Co., Newton, Mass. May 1950. 14f photo, drawing, graph Mi $1.75, Enl Pr $3.75. PB 102775

1. Tubes, Electron - Research 2. Vacuum tubes, Miniature - Research.

Report 1041-5. For 4th and 6th reports see PB 102774 and PB 102776.

ELECTRON TUBE RESEARCH AND DEVELOPMENT SUBMINIATURE VERSIONS OF RMA TYPES 6L6, 6AG7, AND ONE-HALF OF 6AS7. 6TH INTERIM ENGINEERING REPORT PERIOD 1 MAY - 30 JUNE 1950, ON CONTRACT NO. AF 33 (038)-5734, by George Freedman. Raytheon Manufacturing Co., Newton, Mass. Jul 1950. 16f photo, diagrs Mi $1.75, Enl Pr $3.75. PB 102776

1. Tubes, Electron - Research 2. Vacuum tubes, Miniature - Research.

Report 1041-6. For 4th-5th reports see PB 102774-102775.

INVESTIGATION OF NON-SCANNING TECHNIQUES FOR RF SPECTRUM ANALYSIS, by Stanley F. Kaisel. Stanford University, Electronics Research Laboratory. Aug 1949. 176f photos, diagrs, graphs Mi $6.50, Enl Pr $23.75. PB 103193

In an investigation of non-scanning techniques for r-f spectrum analysis, an introduction is given to the general problem of the r-f spectrum analyzers, the non-scanning approach, and finally the detail development of a scheme which uses a resonant interaction of an electron beam with crossed a-c electric and d-c magnetic fields. The evaluation of sensitivity and resolution of the system is obtained analytically, and the general theory is confirmed by experimental studies made at 3000 megacycles. Subsidiary techniques, such as low-voltage fluorescent screens, and special magnetic field arrangements are included in this research, that is preparatory to the construction of a non-scanning analyzer tube for 300 megacycles bandwidth at 3000 megacycles. Contract N6-onr-251. SU ERL TR 15.

MICROSPACER ELECTRODE TECHNIQUE, by Otmar M. Stuetzer. U. S. Air Materiel Command. Engineering Division. Components and Systems Laboratory. Electronic Subdivision. Aug 1950. 33p photos Mi $2.25, Ph $5.00. PB 102922

A novel technique for obtaining stable and extremely small spacings is described. Although of possible general usefulness, the present discussion is restricted to the field of electronics. The essential feature of the technique is the use of insulating spacers of glass, quartz or plastic, drawn down from convenient size to microscopic dimensions and combined with metal or semiconductor electrodes. Experimental applications of the technique are described. See also PB 101152 for earlier study. AAF TR 6106.

PRODUCTION SPECIFICATIONS TYPE SD-989. TERMINAL ENGINEERING REPORT ON WORK DONE UNDER CONTRACT NO. W-33-038-AC-15441 FOR THE PERIOD FROM JUNE 25, 1946 TO FEB 28, 1949. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Feb 1949. 47f diagrs Mi $2.50, Enl Pr $7.50. PB 102760

1. SD 989 (Vacuum tube) 2. Vacuum tubes - Standards 3. Vacuum tubes, Diode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Pentode - Research.

PRODUCTION SPECIFICATIONS TYPE SD 992. TERMINAL ENGINEERING REPORT ON WORK DONE UNDER CONTRACT NO. W-33-038-AC-15441 FOR THE PERIOD FROM JUNE 25, 1946 TO FEB 28, 1949. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Feb 1949. 39f drawings, diagrs Mi $2.25, Enl Pr $6.25. PB 102761

1. SD 992 (Vacuum tube) 2. Vacuum tubes - Standards 3. Vacuum tubes, Diode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Pentode - Research.

PRODUCTION SPECIFICATIONS TYPE SD 994. TERMINAL ENGINEERING REPORT ON WORK DONE UNDER CONTRACT NO. W-33-038-AC-15441 FOR THE PERIOD FROM JUNE 25, 1946 TO FEB 28, 1949. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Feb 1949. 50f drawings Mi $2.50, Enl Pr $7.50. PB 102762

1. SD 994 (Vacuum tube) 2. Vacuum tubes - Standards 3. Vacuum tubes, Diode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Pentode - Research.

PRODUCTION SPECIFICATIONS TYPE SD-996. TERMINAL ENGINEERING REPORT ON WORK DONE UNDER CONTRACT NO. W-33-038-AC-15441 FOR THE PERIOD FROM JUNE 25, 1946 TO FEB 28, 1949. Sylvania Electric Products, Inc., Kew Gardens, N Y. Feb 1949. 45f drawings, diagrs Mi $2.50, Enl Pr $7.50. PB 102759

1. SD-996 (Vacuum tube) 2. Vacuum tubes - Standards 3. Vacuum tubes, Diode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Pentode - Research.

PROGRESS REPORT FOR JULY-SEPTEMBER 1950. National Research Council of Canada. Radio and Electrical Engineering Division. Oct 1950. 44p photos, diagrs, graphs Mi $2.50, Ph $6.25. Also available from National Research Council of Canada, Ottawa, Canada. Limited supply, free distribution. PB 102991

1. Radiophysics - Canada 2. Radar - Canada 3. Engineering, Electrical - Canada 4. Electronics - Canada 5. NRCC ERA 189.

PROGRESSION OF MICROWAVE RADIO SCINTILLATION AT WIND SPEED ON AN OVERWATER PATH, by A. W. Straiton and H. W. Smith. Texas. University. Electrical Engineering Research Laboratory. Sep 1949. 8p graphs, tables Mi $1.25, Ph $1.25. PB 102828

A progression study of microwave radio scintillation, at wind speed, on an overwater path was conducted. The fluctuation of the radio signals from a common transmitter were recorded at two receivers placed normal to the radio path and spaced 65 feet apart horizontally. Certain points on the two signal strength-time recordings were correlated in order to determine the time delay between corresponding measured points. The scintillations were found to progress at an average velocity approximately equal to the component of the wind velocity, in the direction determined by the two receivers. Also, two receivers spaced 10 ft apart detected a downward progression of the scintillation. Contract N5 ori-136. Project order I. TU EERL M-10.

RESEARCH AND DEVELOPMENT OF DOUBLE DIODES, LOW-MU TRIODES, HIGH-MU TRIODES AND RF PENTODES FOR OPERATION WITHIN HERMETICALLY SEALED EXPENDABLE ASSEMBLIES. INTERIM ENGINEERING REPORT FOR DEC 1, 1946 TO JAN 1, 1947 ON CONTRACT W33-038-AC-15441, by Robert N. Palmer and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Mar 1947. 8f Mi $1.25, Enl Pr $2.50. PB 102756

1. Tubes, Electronic - Research 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research.

RESEARCH AND DEVELOPMENT OF DOUBLE DIODES, LOW-MU TRIODES, HIGH-MU TRIODES, AND RF PENTODES FOR OPERATION WITHIN HERMETICALLY SEALED EXPENDIBLE ASSEMBLIES. INTERIM ENGINEERING REPORT FOR MAY 1, 1947 TO JUNE 30, 1947 ON CONTRACT W-33-038-AC-15441, by William R. Wheeler, R. N. Palmer, and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Jul 1947. 25f diagrs, graphs, tables Mi $2.00, Enl Pr $5.00. PB 102754

1. Tubes, Electronic - Research 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research. Report AD-TD-5.

RESEARCH AND DEVELOPMENT OF DOUBLE DIODES, LOW-MU TRIODES, HIGH-MU TRIODES, AND RF PENTODES FOR OPERATION WITHIN HERMETICALLY SEALED EXPENDABLE ASSEMBLIES, INTERIM ENGINEERING REPORT FOR JAN 1, TO FEB 29, 1948 ON CONTRACT W-33-038-AC-15441, by Robert N. Palmer and others. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Feb 1948. 22f Mi $2.00, Enl Pr $5.00. PB 102757

1. Tubes, Electronic - Research 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research. Report no. AD-TD-9.

RESUME OF PRINTED CIRCUITS, by Yale Jacobs. U. S. Air Materiel Command. Engineering Division. Components and Systems Laboratory. Electronics Subdivision. Apr 1949. 12p Mi $1.75, Ph $2.50. PB 102908

A memorandum report is presented on the present status of the work being done at AMC on printed circuits and reviews the work of other agencies. It is noted that the fact that printed circuits is not a "cure all" has by now been well established. Equally well established is the fact that it offers advantages for electronic equipment construction attainable by no other means. It remains then to delineate as sharply as possible, the exact applications where printed circuit techniques offer the greatest benefits. This is the program which is now in progress. Only by investigation of all possible circuits in printed circuit form can the necessary data be obtained to arrive at firm conclusions. TSELRES MR 49-20.

SHUNT RESISTANCE OF TUNABLE CAVITY RESONATORS, by Richard C. Honey. Stanford University. Electronics Research Laboratory, Stanford, Calif. Aug 1949. 27p diagrs, graphs Mi $2.00, Ph $3.75. PB 102829

The theory of shunt resistance of tunable radio-frequency cavity resonators is discussed. The resonators have in general an infinite number of resonant frequencies or modes of oscillation, and an infinite number of corresponding tuning curves if the resonator shape is continuously changes. Two distinct types of mode were observed, viz., that between two oscillating modes and that between an oscillating and a non-oscillating mode. An attempt was made to explain the wide variations in shunt resistance often encountered in tunable cavity resonators. These variations were found to be due to the field configurations resulting from mode intersections. The data was obtained largely with the aid of two Kron network analyzers. Contract no. N6 onr-251, Task 7 (NR-078-360). SU ERL TR 19

TENTATIVE SPECIFICATIONS FOR SYLVANIA SUBMINATURE TUBES. FINAL REPORT ON CONTRACT W-33-038-AC-15441, AND ADDENDUM. Sylvania Electric Products, Inc., Kew Gardens, N. Y. Mar 1948-Jun 1949. 108f photos, drawings, diagrs, graphs, tables Mi $4.50, Enl Pr $15.00. PB 102763

1. Vacuum tubes, Diode - Research 2. Vacuum tubes, Triode - Research 3. Vacuum tubes, Pentode - Research 4. Vacuum tubes, Miniature - Research.

Tubes developed under Contract NOrd 7892. Report APL/JHU/TC-18.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441. Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 23f photos, diagrs, graphs Mi $2.00, Enl Pr $5.00. PB 102764

1. SD 988 (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research 5. Vacuum tubes, Miniature - Research.

Development of tubes SD 988, 989B, 990, 991, 992B, 993B, 994B, 995, 996.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441: SD 991 AUDIO P. O. PENTODE. Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 23f photos, diagr, graph Mi $2.00, Enl Pr $5.00. PB 102768

1. SD 991 (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research 5. Vacuum tubes, Miniature - Research.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441: SD 992B HI-MU TRIODE. Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 21f photo, graph Mi $2.00, Enl Pr $5.00. PB 102765

1. SD 992 B (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research 5. Vacuum tubes, Miniature - Research.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441: SD 993 B LOW MU TRIODE. Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 45f photo, diagrs, graphs Mi $2.50, Enl Pr $7.50. PB 102766

1. SD 993 B (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research 5. Vacuum tubes, Miniature - Research.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441: SD 994 B, DOUBLE DIODE (RECEIVING TUBE). Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 28f photos, graphs Mi $2.00, Enl Pr $5.00. PB 102769

1. SD 994 B (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Pentode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Miniature - Research.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441: SD 995 R.F. PENTODE, SEMI REMOTE CUTOFF. Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 22f photo, graph Mi $2.00, Enl Pr $5.00. PB 102767

1. SD 995 (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Triode - Research 4. Vacuum tubes, Pentode - Research 5. Vacuum tubes, Miniature - Research.

TERMINAL REPORT FOR CONTRACT W-33-038-AC-15441: SD 996 R.F. PENTODE, SHARP CUTOFF. Sylvania Electric Products, Inc., Kew Gardens, N. Y. n.d. 35f photos, diagrs Mi $2.25, Enl Pr $6.25. PB 102770

1. SD 996 (Vacuum tube) 2. Vacuum tubes, Diode - Research 3. Vacuum tubes, Pentode - Research 4. Vacuum tubes, Triode - Research 5. Vacuum tubes, Miniature - Research.

Generators, Motors, Transmission, Distribution, and Allied Equipment

DEVELOPMENT WORK ON TWO SIGNAL GENERATORS FOR THE RANGE OF 3650 TO 10,900 MC, by E. W. Weimer and R. H. Snider. U. S. Naval Research Laboratory. 1950. 54p photos, drawings, diagrs, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.50. PB 103039

An experimental model of a signal generator for the frequency range of 3650 to 7300 megacycles has been developed. The 2K-48 Klystron tube employed for the variable oscillator displayed various undesirable characteristics, although it operates throughout the specified frequency range. This tube has been superseded by the QK-205 (RK-5721) for signal generator application, but this oscillator is inadequate to power a signal generator of one milliwatt maximum output. A second coaxial cavity utilizing the QK-205 tube was developed to cover the range of 6800 to 10,900 megacycles. The range was adequately covered, but the desired rf output power of one milliwatt probably cannot be achieved in a signal generator incorporating the necessary output impedance-matching system. NRL R 3728.

IMPEDANCE MATCHING IN COAXIAL LINES WITH SLEEVE AND UNDERCUT IMPEDANCE TRANSFORMERS, by C. B. Barker. U. S. Naval Research Laboratory. Oct 1950. 21p diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.75. PB 103119

The problem of impedance matching in a rigid coaxial line is frequently complicated by space limitations. This difficulty may sometimes be overcome through the use of a sleeve or undercut trans-

former whose length is less than a quarter wavelength. This type of transformer normally yields a more broadband system than the quarter-wave transformer. Areas on an impedance chart where this technique may be employed are delineated. Certain relations between points symmetrically situated on an impedance chart permit a tabulation of transformer dimensions for a limited region to be extended to all parts of the chart. A tabulation of this type is presented in an appendix. NRL R 3752.

TRANSIENT FAULT CURRENTS IN AIRCRAFT D-C SYSTEMS, by D. G. Scorgie. U. S. Naval Research Laboratory. Oct 1950. 20p graphs, table Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 103041

Two simultaneous differential equations have been derived which satisfactorily describe the transient fault current in a shunt-wound aircraft d-c generator in terms of easily obtainable parameters. Improved accuracy of the result is attributed to eliminating the assumption of constant field flux linkages during the transient and substituting the assumption of constant rates of change of field flux linkages with armature and field currents. The field flux leakage coefficient was assumed constant. Theoretical and empirical transients compared favorably for both separately and self-excited generators. The effect of a carbon-pile voltage regulator was successfully predicted. Transient resistance has been redefined in such a manner that its value can be predicted in terms of the physical parameters of the generator. NRL R 3744.

Miscellaneous

ELECTROLYTIC SYNTHESIS OF BATTERY ACTIVE MANGANESE DIOXIDE. FINAL REPORT, PERIOD JUNE 1946 TO JULY 1949, ON PROJECT 107-7 AND APPENDIXES A-C, by G. H. Kissin. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Georgia. Jul 1949. 138f photos, diagrs, graphs, tables Mi $5.50, Enl Pr $18.75. PB 103192

Strategic and commercial considerations involved in the utilization and production of battery grade MnO_2 are discussed, and development of a continuous process for MnO_2 production is outlined. Experimental procedures and results and investigations of the effect of process variables upon the structure and battery properties of the MnO_2 produced are described. Electron microscope, X-ray diffraction, electron diffraction, and chemical studies of the synthetic product were made, and dry cells made with the synthetic depolarizer were subjected to initial and delayed discharge tests. The discrystalling gamma variety of MnO_2 was found to be the most battery active form. Recommendations are made for the development of a more satisfactory anode for use in the electrolytic process. Dept. of the Army project: 3-99-09-022. Signal Corps project: 162B.

PROPOSED STANDARD FOR ELECTRICAL AND ELECTRONIC SYMBOLS, BY E.F.V. ROBINSON, W. J. PURVIS AND H. E. PARSONS, 1ST NOV 1950. National Research Council of Canada. Radio and Electrical Engineering Division. Revised. Dec 1950. 59p diagrs Mi $2.75, Ph $7.50. Also available from National Research Council of Canada, Ottawa, Canada $.50. PB 102992

1. Symbols, Electrical - Canada 2. Symbols, Electronic - Canada 3. NRCC ERA 199 4. NRCC 2307.

Cover date is Jan 1951.

FOOD AND KINDRED PRODUCTS

APPETITE LEVELS OF FOOD CONSUMPTION - IOWA, BY ERCEL S. EPPRIGHT. REPORT NO. 7, 1 JULY 1946 - 31 JANUARY 1949. U. S. Quartermaster Food and Container Institute. Committee on Food Research. 1949. 8p Mi $1.25, Ph $1.25. PB 103022

A study has been made of a daily dietary and of certain attitudes toward food of a random sample of the 17 to 19 and the 46 to 58 year-old people of Iowa. The diets were inspected for their content in certain foods and food groups which are considered important in the formation of a good diet. Termination report, initiation date 1 July, 1946, on Contract W11-009-qm-70229. Project no. 7-84-15-07. QMC FCI Contract W11-009-qm-70229, Report 7.

ASSAY METHODS, CHEMICAL AND PHYSIOLOGICAL PROPERTIES OF BROWNING SUBSTANCES IN FOODS AND THEIR DERIVATIVES IN URINE, BY THEODORE E. FRIEDEMANN AND PATRICIA K. KEEGAN. REPORT NO. 3, SEPTEMBER 1, 1949 - AUGUST 31, 1950. U. S. Quartermaster Food and Container Institute. 1950. 33p tables Mi $2.25, Ph $5.00. PB 103025

Spectrophotometric data are given for the absorption of light by furfural, methylfurfural (MF), and hydroxymethylfurfural (HMF) in 0.001 N acid and in absolute alcohol. Data are also given for furfuryl alcohol, furoic acid, furoin, and furil and for the following compounds: acetone, acetol, methyl glyoxal, pyruvic, levulinic, and a-ketoglutaric acids, diacetyl, acetyl acetone, acetonyl acetone, reductic and dehydroreductic acids. The use of charcoal, which removes furfural and oxidizes reductic acid to dehydroreductic acid, and the use of Lloyd's reagent, which does not remove furfural but removes the effect of reductic acid by oxidation to dehydroreductic acid, is described. The application of these findings to the identification and quantitative analysis of furfurals is discussed. The preparation of pure MF and of reductic acid is described. Termination report, initiation date Sep. 1, 1949, on Contract no. W11-183-qm-8132. Project no. 7-84-12-006. QMC FCI Contract W11-183-qm-8132, Report 3.

BROWNING REACTION, BY CHARLES D. HURD, L. ROSNATI, AND C. BUESS. REPORT NO. 14, JULY 1, 1949 - SEPTEMBER 30, 1950. U. S. Quartermaster Food and Container Institute. Committee on Food Research. 1950. 6p Mi $1.25, Ph $1.25. PB 103015

This present report includes new findings on aldol-type condensations between aldehydes and alpha-hydroxy ketones, the reaction of benzoin with an amine, and the reaction of benzoin with alanine. In the last experiment, isolation of tetraphenylpyrrole, tetraphenylpyrazine, acetaldehyde and carbon dioxide leads to the suggestion that color formation in the browning reaction may be due in part at least to compounds containing dipyrromethene groupings.

Termination report, initiation date, July 1, 1949 on Contract no. W11-183-qm-8144. Project no. 7-84-17-05. Progress report no. 12 and annual report no 13 (PB 101828) cover the aspects of this problem which have been reported earlier in considerable detail . Work is continuing under Contract DA 11-009-qm-1355. QMC FCI Contract W11-183-qm-8144, Report 14.

DEVELOPMENT OF IMPROVED CANNED MEAT PRODUCTS, ESPECIALLY BEEF, BY R. G. TISCHER AND R. R. SEALOCK. REPORT NO. 14, 1 JULY 1949 - 30 JUNE 1950. U. S. Quartermaster Food and Container Institute. 1950. 3p tables Mi $1.25, Ph $1.25. PB 103023

1. Meat, Canned - Processing 2. Beef, Canned - Processing 3. Rath Packing Co., Waterloo, Iowa 4. Iowa. Agricultural Experiment Station, Ames, Iowa 5. QMC FCI Contract W11-183-qm-8123, Report 14.

Annual report, initiation date 1 July 1949, on Contract W11-183-qm-8123. Project no. 7-84-17-09.

FACTORS AFFECTING HEAT RESISTANCE OF SPORES OF CLOSTRIDIUM BOTULINUM, BY G.M. DACK AND HIROSHI SUGIYAMA. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. REPORT NO. 11, 1 JULY 1949 - 30 SEPTEMBER 1950. 1950. 1p Mi $1.25, Ph $1.25. PB 103018

Work of the past year has dealt primarily with the heat resistance of spores grown in the presence of different fatty acids. The conclusion has been reached that the presence of fatty acids in the sporulating medium increases the heat resistance of the developing spores. In general, it seems that the longer the fatty acid chain, the greater is the increase in heat resistance. Annual report, initiation date, 1 July 1949, on Contract no. W11-183-qm-8122, Project no. 7-84-12-10. QMC FCI Contract W11-183-qm-8122, Report 11.

MECHANISMS OF CHEMICAL CHANGES AFFECTING THE ACCEPTABILITY OF BEVERAGE MILK PRODUCTS, BY D. V. JOSEPHSON, F. J. DOAN, S. PATTON, J. T. HUTTON AND E. F. PRICE. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. REPORT NO. 17, 1 SEP 1949 - 31 AUG 1950. 1950. 7p Mi $1.25, Ph $1.25. PB 103019

One procedure which has been developed to over come flavor deteriation in the lipid phase of whole milk powder involves use of a hydrogenated vegetable fat in place of butter fat. As a possible alternative to this procedure, attempts have been made to develop a blend flavored, hydrogenated butter fat for use in dry whole milk. Present efforts are being directed toward development of a practical method for removing serum proteins from milk prior to drying. Fundamental studies concerning the chemical effects of heat on milk have been extended. Additional compounds which have been isolated from heated milk are hydroxy methylfurfural, acetol and acetic acid. Presumptive evidence of the presence of acetaldehyde in heated milk has also been obtained. Annual report, initiation date 1 October 1948, on Contract no. DA11-183-qm-22, Project no. 7-84-15-06. QMC FCI Contract DA11-183-qm-22, Report 17.

MECHANISM OF DETERIORATIVE CHANGES IN MILK PRODUCTS, BY S. T. COULTER, HERBERT HARLAND, AND ROBERT JENNESS. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. COMMITTEE ON FOOD RESEARCH. REPORT NO. 10, 1 JULY 1949-30 SEPTEMBER 1950. 1950. 4p Mi $1.25, Ph $1.25. PB 103016

1. Milk products - Deterioration 2. Milk, Dehydrated - Deterioration 3. Minnesota. Agricultural Experiment Station, St. Paul, Minn. 4. QMC FCI Contract W11-183-qm-7960, Report 10.

Termination report, initiation date, July 1, 1949, on Contract no. W11-183-qm-7960, Project 7-84-06-10.

PHYSIOLOGICAL STUDIES ON SPORE FORMATION AND SPORE GERMINATION, BY O. B. WILLIAMS, J. W. FOSTER, W. A. HARDWICK, L. L. CAMPBELL, EUGENE B. BLAIR AND HOWARD PURNELL. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. REPORT NO. 14, 1 OCTOBER 1949 - 31 SEPTEMBER 1950. 1950. 148p graph, tables Mi $5.75, Ph $18.75. PB 103017

PART I: It would appear that synthetic media would provide a valuable tool for the study of many of the fundamental factors concerned in spore formation, spore germination and spore resistance. However, although media adequate for growth of many of the aerobic sporulating rods have been formulated very few of these media have been adequate for spore formation. It has been possible to establish the nature of certain of the deficiencies of such media so far as a few of the aerobic spore formers is concerned, but no comparable data for anaerobic spore bearers have been available and in fact synthetic media for anaerobic spore bearing bacteria have not been numerous. PART II: The presence in certain complex media of an antisporulation factor which can be removed by norite adsorption has been known for some years. The exact nature of the factor has not, however, been established. This part of the research program on spores has been concerned with attempts to characterize the antisporulation factor. PART III: An effort extending over several years has been made to establish the relationship between the moisture content of the substrate and germination of spores, growth, and spore formation for Clostridium botulinum. PART IV: It has not been certain whether the action of subtilin was due to inhibition of spore germination or to sporocidal properties. An experiment on a group of thermophilic organisms is under incubation. Details of the experimental procedure and the results obtained will be the subject of a progress report in due time. Termination report, initiation date 1 October, 1949 on Contract W11-183-qm-8146, Project no. 7-84-12-10. QMC FCI Contract W11-183-qm-8146, Report 14.

ROLE OF STARCH IN BREAD STALING, BY R. M. SANDSTEDT, ROBERT L. GATES, PAUL H. FIGARD, CHARLES E. FERGUSON. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. REPORT NO. 11, 1 NOVEMBER 1949 - 30 JUNE 1950. 1950. 32p tables Mi $2.25, Ph $5.00. PB 103024

The study of the process of starch gelatinization which would eventually shed some light on the reverse processes of staling and retrogradation has involved the effect of several ions and certain organic compounds on the temperature of initial gelatinization of wheat starch. A theoretical consideration of the relation of certain ions to the structure of water suggests that a critical energy environment represented

by some particular degree of water polymerization is necessary to accomplish the dispersal of the starch granule. It seems possible that the observed effects of ions in solution on starch gelatinization may result from an increase or decrease in the degree of polymerization of water produced by these ions at any given temperature with a consequent increase or decrease in the gelatinization temperature of the starch. Annual report, initiation date 1 July 1949, on Contract no. DA11-183-qm-23. Project no. 7-84-17-07. QMC FCI Contract DA11-183-qm-23, Report 11.

SIGNIFICANCE OF SALMONELLA TYPES, BY G.M. DACK AND MORRIS D. SCHNEIDER. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. REPORT NO. 2, 1 JANUARY 1947-30 JUNE 1949. 1949. 8p Mi $1.25, Ph $1.25. PB 103020

1. Food - Toxicity 2. Salmonella - Types 3. Eggs, Dehydrated - Poisoning 4. Eggs, Duck 5. Chicago. University. Division of Biological Sciences. Food Research Institute 6. QMC FCI Contract W11-009-qm-70305, Report 2.

Termination report, initiation date 1 January 1947, on Contract W11-009-qm-70305. Project no. 7-84-12-10.

STUDIES ON APPETITE MECHANISMS AS DETERMINED BY NUTRITION, BY L. T. SAMUELS, H. C. GOLDTHORPE, R. G. HANSEN AND S. R. DICKMAN. U. S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE. REPORT NO. 4, APRIL 1, 1947 - SEP. 30, 1949. 1949. 28p tables Mi $2.00, Ph $3.75. PB 103021

1. Appetite - Physiology 2. Nutrition - Metabolism 3. Food - Metabolism 4. Utah. University. Medical School. Dept. of Biological Chemistry, Salt Lake City, Utah 5. QMC FCI Contract W11-009-qm-70307, Report 4.

Termination report, initiation date April 1, 1947, on Contract W11-009-qm-70307. Project no. 7-84-15-02.

FUELS AND LUBRICANTS

DESIGN, CONSTRUCTION, AND OPERATION OF A DISTILLATION LABORATORY FOR THE SYNTHETIC LIQUID FUELS PROGRAM, by J. Feldman, P. Pantazoplos, G. Pantazoplos, and M. Orchin. U. S. Bureau of Mines. Feb 1951. 19p photos, diagrs, table Mi $1.75, Ph $2.50. PB 102898

This report contains a description of the distillation laboratory at Bruceton, Pa., which was established to aid in the separation and identification of the products produced in the synthetic liquid fuel processes under study there. BM RI 4764.

ENGINE EVALUATION OF ELEVEN COMPOUNDS FROM API RESEARCH PROJECT 45 AND ONE COMPOUND FROM THE NATIONAL BUREAU OF STANDARDS, by H. E. Hesselberg and W. G. Lovell. Ethyl Corporation. Research Laboratories, Detroit, Mich. Nov 1948-Jun 1949. 5p graph, table Mi $1.25, Ph $1.25. PB 102864

Eleven compounds were evaluated in a 17.6 engine by the knock-limited, supercharged procedure. The compounds tested include 2,2-dimethylpropane, 2-methyl-1-pentene, 4-methyl-1-pentene, 3,3-dimethyl-2-isopropyl-1-butene, 1,1-butene, 1,1,3-trimethylcyclopentane, 1-methyl-3-isopropylbenzene (B), 2-methylfuran,2-methyltetrahydrofuran, trans-decahydronaphthalene, cis-decahydronaphthalene, and 2-methylpiperidine. Data which could be conveniently tabulated are shown in a table and a graph of the knock-limited IMEP versus fuel/air ration is also included. Report no. AR-200. Includes Report AR-202 on engine evaluation of nine compounds from API research project 45, one hydrocarbon from National Bureau of Standards, and one hydrocarbon from Phillips Petroleum Company, by W. I. Zang. API research project 45.

LABORATORY-SCALE WORK ON SYNTHESIS-GAS PRODUCTION, by J.J.S. Sebastian, P. W. Edeburn, F. Bonar, L. W. Bonifield and L. D. Schmidt. U. S. Bureau of Mines. Jan 1951. 61p photos, diagrs, tables Mi $3.00, Ph $8.75. PB 102791

The process described in this paper, based on the continuous production of synthesis gas by "downdraft" entrainment of powdered coal in oxygen and superheated steam, has been in operation for more than 3 years, being as far as is known, the first pulverized-fuel gasification unit in this country capable of continuous operation. Operated at feed rates up to 45 pounds of coal per hour, corresponding to an hourly throughput rate of about 33 pounds of coal per cubic foot of generator volume, the process is well suited for testing various types of fuels for their utility in making synthesis gas on a commercial scale. Owing to its simplicity and ease of control, the apparatus can be used for much-needed fundamental research on the kinetics and mechanism of powdered-fuel gasification. Presented in part before the Gas and Fuel Chemistry Division of the American Chemical Society, St. Louis, Mo., Sept. 1948. Work done in cooperation with West Virginia University. BM RI 4742.

LUBRICATING OIL SYNTHESIS. EXAMINATION OF CRACKED PRODUCTS AND CRACKING PROCESSES. APPARATUS FOR TESTING THE OXYGEN STABILITY OF LUBRICATING OILS. Ruhrchemie A. G., Oberhausen, Ger. 1937-1944. 247f drawings, graphs, tables (Text in German) Mi $9.00, Enl Pr $32.50. PB 103100

1. Granosil (Trade name) 2. Kogasin (Trade name) 3. Kondensatbenzin (Trade name) 4. Lubricating oils, Synthetic - Synthesis - Germany 5. Lubricating oils - Ageing - Germany 6. Lubricating oils - Stability - Germany 7. Lubricating oils - Production - Germany 8. Gasoline - Polymerization - Germany 9. Petroleum - Cracking - Germany 10. Braunkohle Benzin A. G., Carburol Plant 11. Micro BIOS FD 5605/47, Frames 1-335.

Abstract available as PB 103100s. 2p. Mi $1.25, Ph $1.25.

MATHEMATICAL EXPRESSIONS FOR DROP SIZE DISTRIBUTION IN SPRAYS, by Rowland S. Bevans. Mar 1949. 33f graphs, tables Mi $2.25, Enl Pr $6.25. PB 103189

A number of mathematical expressions were proposed for the particle-size distributions of crushed solids and of liquid drops in sprays. The Nukiyama-Tanasawa, Rosin-Rammler, and logarithmico-normal distribution expressions fitted the experimental

size distribution data for an oil spray in an acceptable manner. The Rosin-Rammler distribution was somewhat superior to the others in fitting this data. All three equations are fitted to Kolupaev's data on a pressure-atomized oil spray, and all produced distribution curves that are in reasonable agreement with the data. The closest agreement is produced by the Rosin-Rammler expression. Prepared for Conference on fuel sprays, University of Michigan, Ann Arbor, Mich., Mar 30-31, 1949.

SOME PHYSICAL PROPERTIES OF THE SYSTEM HYDRAZINE-WATER, by Milton Drake Sprinkel. Aug 1949. 45p photo, drawing, graphs, tables Mi $2.50, Ph $6.25. PB 102834

An investigation was made to determine the vapor pressure-temperature relationships for pure hydrazine and the system hydrazine-water. This relationship was determined over a temperature range of 30°C to 100°C with an estimated error of 1%. The refractive indices of hydrazine, hydrazine hydrate and various compositions of hydrazine and water were determined over a temperature range of 24°C to 35°C with a maximum error of 0.02%. Vapor-liquid equilibria data were calculated at a total pressure of 200 mm of mercury by utilizing the Van Lear solution of the Duhem equation. Thesis-Purdue University.

SYNTHETIC LIQUID FUELS. ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1950. U. S. BUREAU OF MINES. OFFICE OF SYNTHETIC LIQUID FUELS, PITTSBURGH, PA. PART I: OIL FROM COAL. Feb 1951. 161p photos, drawings, graphs, tables Mi $6.25, Ph $21.25. PB 102985

1. Fuels, Liquid - Production 2. Coal - Hydrogenation oils 3. BM RI 4770.

See PB 102986 - PB 102988 for Parts II - IV.

SYNTHETIC LIQUID FUELS. ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1950. PART II: OIL FROM OIL SHALE. U. S. BUREAU OF MINES. OFFICE OF SYNTHETIC LIQUID FUELS, PITTSBURGH, PA. Feb 1951. 180p photos, drawings, graphs, maps, tables Mi $6.50; Ph $22.50. PB 102986

1. Fuels, Liquid - Production 2. Oil shales - Hydrogenation 3. Shale oil - Production 4. BM RI 4771.

See PB 102985, PB 102987 - PB 102988 for Parts I, III-IV.

SYNTHETIC LIQUID FUELS. ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1950. PART III: LIQUID FUELS FROM AGRICULTURAL RESIDUES. U. S. Bureau of Mines. Office of Synthetic Liquid Fuels, Pittsburgh, Pa. Feb 1951. 33p diagrs, drawings Mi $2.25, Ph $5.00. PB 102987

1. Fuels, Liquid - Production 2. Cellulose - Hydrolysis 3. Corncobs - Uses 4. BM RI 4772.

See PB 102985 - PB 102986, PB 102988 for Parts I-II, IV.

SYNTHETIC LIQUID FUELS. ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1950. U. S. BUREAU OF MINES. OFFICE OF SYNTHETIC LIQUID FUELS, PITTSBURGH, PA. PART IV: OIL FROM SECONDARY RECOVERY AND REFINING. Feb 1951. 38p photos, diagrs, drawing, graphs Mi $2.25, Ph $5.00. PB 102988

1. Fuels, Liquid - Production 2. Petroleum, Crude - Sources 3. Petroleum - Sulfur compounds recovery 4. Sulfur compounds - Organic - Removal 5. BM RI 4773.

See PB 102985 - PB 102987 for Parts I-III.

HIGHWAYS AND BRIDGES

INVESTIGATION OF ROAD FOUNDATION FAILURES, by W. A. Lewis. Gt. Brit. Dept. of Scientific and Industrial Research. Road Research Laboratory, Harmondsworth, England. Jul 1950. 40p photos, diagrs, graphs, tables (1 fold) Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 103071

1. Roads - Foundations - Failures - Gt. Brit. 2. DSIR RR TR 21.

S.O. Code no. 47-110-21.

SNOW FENCES, by H. Ll. D. Pugh. Gt. Brit. Dept. of Scientific and Industrial Research. Road Research Laboratory, Harmondsworth, England. 1950. 62p photos, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 102844

1. Fences, Snow - Gt. Brit. 2. DSIR RR TP 19.

S.O. Code no. 47-110-19.

SURFACE DRAINAGE: RESEARCH REPORT NO. 11-B. COMMITTEE REPORT AND THREE PAPERS PRESENTED AT THE TWENTY-NINTH ANNUAL MEETING 1949. U. S. Highway Research Board. Dec 1950. 59p maps, graphs, tables Available from Highway Research Board, U. S. National Research Council, 2101 Constitution Ave., Washington 25, D.C. $.90. PB 102906

1. Drainage, Surface 2. Floods, Regional - Frequency 3. Watersheds, Agriculture 4. Curbs - Opening inlets 5. U. S. Highway Research Board. Research report no. 11B.

Includes the following papers: Progress report, Committee on surface drainage, by Carl F. Izzard. p. 1-3. Regional flood frequency, by Tate Dalrymple. p. 4-20. - Surface runoff from agricultural watersheds, by W. H. Potter, p. 21-35. - Tentative results on capacity of curb opening inlets, by Carl F. Izzard. - p. 36-51. - Discussion of "Tentative results on capacity of curb opening inlets", by Stifel W. Jens. p. 51-54.

TYPES OF ROAD SURFACING AND MAINTENANCE USING TAR OR ASPHALTIC BITUMEN, by A. R. Lee. Gt. Brit. Dept. of Scientific and Industrial Research. Road Research Laboratory, Harmondsworth, Eng. Second edition. Aug 1950. 28p photos Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 103073

1. Roads - Surface treatment - Bituminous materials - Gt. Brit. 2. Roads - Surface treatment - Bitumen-tar mixtures - Gt. Brit. 3. DSIR RRL RN 5, Ed. 2.

S.O. Code no. 47-141-5-50.

INSTRUMENTS

COUNTERS FOR COSMIC RAYS, by C.G. Montgomery. Yale University. Sloane Physics Laboratory. Oct 1949. 80p photo, diagrs, graphs Mi $3.50, Ph $10.00. PB 102810

The discussion of counters and their use is conveniently divided into five parts. First the mechanism of the counter discharge itself is treated. Then the construction of cosmic-ray counters is described. The basic circuits used with counters form the subject of the third part. The application of counters and circuits are treated next and a discussion is included of the efficiencies of counters and circuits and general considerations about the use of cosmic-ray telescopes and shower-detecting arrangements of counters. The last part is devoted to counters of special types. Contract N7onr-288, Task order 3, code NR-021-049. Technical report no. 2.

ELECTROLYTIC CAPACITORS AT LOW TEMPERATURES, by C. D. Crater. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Aug 1950. 23p graphs, tables Mi $2.00, Ph $3.75. PB 102820

This report has been prepared to present a review and analysis of available information concerning the expected performance characteristics of electrolytic capacitors at low temperatures, and to present date based on actual measurements of representative capacitors which development or application engineers may utilize in preparation of circuit parameters in new designs or modification of existing equipment. D.A. no. 3-91-02-809. Project no. 2008-2. From Performance Test Section, Components and Materials Branch, Squier Signal Laboratory, Fort Monmouth, New Jersey. SCEL TM M-1133.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 11, APR 1-NOV 1, 1948. REPORT OF WORK UNDER CONTRACT NOBSR-39269. Pennsylvania. University. Moore School of Electrical Engineering. Nov 1948. 69p diagrs, graphs Mi $3.00, Ph $8.75. PB 103055

1. Noise - Measurement 2. Meters, Sound.

For Progress reports no. 1-10, 12-19 see PB 85974-85981, 110114-110119, 101545-101546,103056-103057. Ser. no. 49-7.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 18, JULY 1, 1950-SEP 30, 1950. REPORT OF WORK UNDER CONTRACT NOBSR 49128. INDEX NE-120803, by Conrad J. Fowler, Ernest Frank, Francis T. Nicholson. Pennsylvania. University. Moore School of Electrical Engineering. Oct 1950. 63p diagrs, graphs Mi $3.00, Ph $8.75. PB 103056

1. Noise - Measurement 2. Meters, Sound.

Research Div. Report no. 51-9. For Progress reports 1-17,19 see PB 85974-85981, 110114-110119, 101545-101546, 103055, 103057.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 19, OCT 1, 1950-DEC 31, 1950. REPORT OF WORK UNDER CONTRACT NOBSR 49128 INDEX NE-120803, by Conrad J. Fowler. Pennsylvania. University. Moore School of Electrical Engineering. Jan 1951. 8p diagr, graph Mi $1.25, Ph $1.25. PB 103057

1. Noise - Measurement 2. Meters, Sound.

Research Div. Report no. 51-18. For Progress reports 1-18, see PB 85974-85981, 110114-110119, 101545-101546, 103055-103056.

NON-DESTRUCTIVE TESTING OF MATERIALS ACCORDING TO DR. FÖRSTER. Deutsche Röhrenwerke A. G., Düsseldorf, Ger. n.d. 20f photos (Text in German and English) Mi $1.75, Enl Pr $3.75. PB 102956

1. Non-destructive tests - Germany 2. Testing equipment - Germany 3. Micro BIOS FD 1085/49, Frames 1-12+6.

English abstract included. Abstract available as PB 102956s. 2p. Mi $1.25, Ph $1.25.

STEADY-STATE CHARACTERISTICS OF CARBON-PILE VOLTAGE REGULATORS, by D. G. Scorgie and D. H. Schaefer. U. S. Naval Research Laboratory. Dec 1950. 15p diagrs, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 103122

Measurements of regulator carbon-pile resistance as a function of operating coil voltage, have been made with recently developed equipment. The factors contributing to nonlinearities and errors in the regulator have been studied in detail particularly where heating and hysteresis were concerned. A theoretical analysis explains the effects of magnetic hysteresis, carbon-pile hysteresis, ambient temperature, and localized heating of the carbon pile and operating coil. Study of the theoretical and experimental results reveals the important role played by carbon-pile power dissipation in determining steady-state operation. Although magnetic hysteresis in the regulator iron is extremely small, its effect is amplified many times by the variable air gap and its importance is far greater than had been anticipated. However, magnetic hysteresis is found to have the beneficial effect of permitting good regulation of large disturbances yet tending to stabilize the regulated system in the steady state. NRL R 3773.

TECHNISCHE ANLEITUNG FÜR OBERFLACHEN-PRUFAPPARAT. (SURFACE TESTING APPARATUS: TECHNICAL DIRECTIONS FOR APPARATUS NO. 3837). Maag - Zahnraeder A. G., Zürich, Switzerland. Dec 1950. 15p photos Mi $1.75, Ph $2.50. PB 103081

1. Surfaces - Testing equipment - Switzerland 2. NAVSHIPS T 401.

Translated December 1950, by Frank Rizzo.

TYPE AN6004-1 AND TYPE A-14 OXYGEN REGULATOR DIAPHRAMS, by C. E. Jaynes. U. S. Air Materiel Command. Engineering Division. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1950. 2p Mi $1.25, Ph $1.25. PB 103006

1. Diaphragms, Oxygen regulator 2. AN6004-1 (Oxygen regulator diaphragms) 3. A-14 (Oxygen regulator diaphragms) 4. AAF TSEAM T50-211.

MCREXM/T50-211.

MACHINERY

CORE BLOWING EQUIPMENT FOR FOUNDRY WORK, STATEMENT by Dr. Schulte-Heerbrugger. Vogel & Schemmann A. G., Hagen, Ger. Feb 1947. 4f Mi $1.25, Enl Pr $1.50. PB 102960

1. Foundries - Machines - Germany 2. Cores, Sand - Manufacture - Germany 3. Machines, Core-blowing - Germany 4. Sand casting - Germany 5. Micro BIOS FD 1093/49, Frames 1-3.

Abstract included. Abstract available as PB 102960s. 1p. Mi $1.25, Ph $1.25. For detailed description of this machine see Micro BIOS FD 2185/48.

DESIGN AND TEST OF AN AXIAL FLOW FAN USING BLADES FROM A JUMO-004 TURBINE, by Edward L. Dock. Jan 1949. 61p photos, diagrs, graphs, tables Mi $3.00, Ph $8.75. PB 102861

An axial flow fan using blades from a Jumo 004 turbine was designed and tested. The fan was designed to deliver 165 cubic feet of air per minute at a velocity of 350 feet per second and a pressure rise of 44.9 pounds per square foot at 7000 rpm. The fan had a pitch of 0.196 feet and a solidity of 0.633 with 16 blades. In the tests the fan did not get up to the speed for which it was designed because not enough power was available, thus keeping the efficiency lower than orginally anticipated. Thesis-Rensselaer Polytechnic Institute.

DRAWINGS OF LOW AND MEDIUM PRESSURE EQUIPMENT FOR HYDROGENATION PLANT. Lurgi Gesellschaft für Wärmetechnik m.b.H., Frankfort, Ger. 1927-1941. 37f drawings only (Legends in German) Mi $2.25, Enl Pr $6.25. PB 102958

1. Hydrogenation plants - Equipment - Germany 2. Micro BIOS FD 171/47, Frames 1-13+22.

English abstract included. Abstract available as PB 102958s. 2p. Mi $1.25, Ph $1.25.

FERROPRINTS RELATING TO HYDRAULIC PRESSES. Hydraulik G.m.b.H., Duisburg, Ger. 1936-1942. 171f drawings only (Legends in German) Mi $6.50, Enl Pr $23.75. PB 103089

1. Hydraulic equipment - Design - Germany 2. Hammers, Hydraulic - Design - Germany 3. Presses, Hydraulic - Design - Germany 4. Micro BIOS DOCS/2902/1922 5. Micro BIOS FD 128/48, Frames 1-28+111.

Some frames will not reproduce well. Abstract available as PB 103089s. 1p. Mi $1.25, Ph $1.25. See also BIOS FR 1102.

GENERAL THROUGH-FLOW THEORY OF FLUID FLOW WITH SUBSONIC OR SUPERSONIC VELOCITY IN TURBOMACHINES OF ARBITRARY HUB AND CASING SHAPES, by Chung-Hua Wu. U. S. National Advisory Committee for Aeronautics. Mar 1951. 40p diagrs Mi $2.25, Ph $5.00. PB 103108

A general steady through-flow theory of nonviscous fluid in turbomachines of arbitrary hug- and casing-wall shapes with subsonic and supersonic velocities is presented. The theory is applicable to both direct and inverse problems and is derived primarily for use in turbomachines having thin blades of high solidity with a simple approximate correction factor for blade-thickness effects. The equations of continuity and motion in the radial direction are combined into a principal equation. When the tangential velocity of gas or a relation between tangential and axial velocity is prescribed in design, the equation is elliptic or hyperbolic, depending on whether the meridional or relative velocity is subsonic or supersonic, respectively. A general method of solution for both cases is outlined. Specific application to several types of turbomachine is discussed. NACA TN 2302.

MANUFACTURE AND USE OF HIGH SILICON IRON IN GERMANY: HIGH SILICON IRON CENTRIFUGAL PUMP FROM WESSLINGER GÜSSWERKE-"T" FORCE SERIAL NO. 2278. British Intelligence Objectives Sub-Committee. 1948. 27f drawings Mi $2.00, Enl Pr $5.00. PB 102950

1. Pumps, Centrifugal - Tests - Germany 2. BIOS FR 594 addendum 3. Micro BIOS FD 304/50, Frames 1-9+18.

Addendum to BIOS FR 594 (PB 42742) Listed on p. 21. Abstract available as PB 102950s. 1p. Mi $1.25, Ph $1.25.

QUANTITATIVE MEASUREMENT OF DETONATION INTENSITY IN INTERNAL COMBUSTION ENGINES, by Gustaf E. V. Jonsson. 1950. 27p photos, diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 102933

A method for objective measurement of the detonation intensity in internal combustion engines is described. The pickup used is insensitive to mechanical vibration and its electrical output is proportional to the rate of change of pressure in the burning gas. The detonation meter responds only to the high frequencies associated with detonating combustion. The instrument is especially useful in detecting very weak detonation and for quantitative measurement of the detonation intensity. Investigation of the influence of the operating conditions on the detonation intensity has given an explanation why large differencies in ratings are obtained with different octane rating methods. Mechanical Engineering series Vol. 1, no. 10. Acta polytechnica no. 62, 1950.

SEVENTH PARTIAL REPORT ON THE PULSE-JET ENGINE:- MEASUREMENT OF THE AIR-FUEL RATIO, by D. W. Baker. U. S. Naval Research Laboratory. Oct 1950. 15p photos, diagr, graphs, table Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50 PB 103121

The report presents data which show that the air-fuel ratio for the pulse-jet engine may be determined from calculations based on the chemical analysis for the amount of carbon dioxide, free oxygen, and carbon monoxide in the exhaust gases, provided that engine operation is steady and that the samples are drawn from a position between the forward part of the tailpipe inflow and the initial combustion zone. NRL R 3741.

MEDICAL RESEARCH AND PRACTICE

ACTIVITIES OF THE VASCULAR SYSTEM DURING HYPOXIA. I: THE ACTIVITY OF THE SPLEEN IN

HYPOXIA, by Kurt Kramer and Ulrich C. Luft. U.S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Dec 1950. 19p graphs, tables Mi $1.75, Ph $2.50. PB 102826

This report discusses the functions of the spleen as a blood reservoir in severe hypoxia simulating that induced by acute exposure to high altitudes. Formerly project no. 21-02-112. AAF SAM Proj 21-23-013, Report no. 1.

ALASKAN WET-COLD FIELD TEST OF EXPERIMENTAL PERSONAL AND SURVIVAL EQUIPMENT, by Harold L. Strong. U. S. Air Materiel Command. Engineering Division, Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1950. 36p photos, graph Mi $2.25, Ph $5.00. PB 102999

1. Survival, Arctic 2. Survival equipment 3. Cold - Physiological effects 4. AAF TSEAA MR 670-21R.

DISCRIMINATION OF COLOR. I: EXPERIMENTAL EVALUATION OF FOUR METHODS FOR MEASURING THE DIFFERENCE LIMEN OF CHROMATICITY, by Harry G. Sperling and Dean Farnsworth. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Sep 1950. 62p drawings, diagrs, graphs, tables Mi $3.00, Ph $8.75. PB 103074

The difference limen in one dimension through a single point in the I.C.I. chromaticity plane was measured using four different psychophysical methods and four surround brightnesses with four highly trained, color normal observers. The psycho-physical methods were: (a) Method of Constants - judged "Same or different", (b) Method of Constants - judged "with direction", (c) Method of Paired Comparisons and (d) Method of Adjustments. The data were evaluated using a Latin square design and the analysis of variance. Bu Med Project NM003041.19.01. V. 9, 1950, p. 54-89. Color vision report no. 23. NAV MRL 154.

EFFECT OF ULTRAVIOLET RADIATION FROM FLUORESCENT LIGHTS ON DARK ADAPTATION AND VISUAL ACUITY, by Mary Sexton, Florence Malone and Dean Farnsworth. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Dec 1950. 28p diagr, graphs, tables Mi $2.00, Ph $3.75. PB 103077

The effect of ultraviolet radiation from illuminants of 20 footlamberts (the highest brightness level commonly found in submarines) on scotopic thresholds and on visual acuity was investigated. No differences were found in the curves of dark adaptation after pre-adapting for one hour to fluorescent, to ultraviolet-shielded fluorescent and to incandescent light. No differences were found in acuity after pre-adapting to each of these illuminants. Bu Med Project NM003041.38.01. V. 9, 1950, p. 301-317. NAV MRL 169.

FACTORS AFFECTING CONSCIOUSNESS TIME AT ALTITUDE, PART II, by F. G. Hall. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1950. 26p graphs, tables Mi $2.00, Ph $3.75. PB 102921

The time of consciousness following loss of oxygen supply at altitude is influenced by many complex factors. The dilution of the oxygen which aviators breathe, with nitrogen or carbon dioxide, decreases the time of consciousness during subsequent breathing of ambient air. The importance of mask leakage is apparent. A comparison of the time of consciousness following rapid decompression and following loss of oxygen supply at a fixed altitude indicate 20% greater time reserve in the latter situation. The procedure used is a useful "Tool" in evaluating certain environmental factors found in high flying aircraft. For part I see PB 97032. AAF TR 6009.

PERISCOPE ACUITY AT NIGHT. I: CENTRAL AND PARACENTRAL ACUITY AS A FUNCTION OF CONTRAST AND ADAPTATION, by Harry G. Sperling and Dean Fransworth. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Nov 1950. 30p drawing, graphs, tables Mi $2.00, Ph $3.75. PB 103075

Discrimination of a target approximating the visual subtense of a ship at 5,000 yards on low power was measured with the right eye at nine retinal positions, from central fixation to 15° off central vision. Target to background contrast was varied to sample a range of visibility conditions at sea. Bu Med Project NM003041.39.01. V. 9, 1950, p. 128-149. NAV MRL 157.

RELATION OF DARK ADAPTATION TO DURATION OF PRIOR RED ADAPTATION, by Richard T. Mitchell, Ailene Morris and Forrest L. Dimmick. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Dec 1950. 19p graphs, tables Mi $1.75, Ph $2.50. PB 103076

The effects of duration of red preadaptation upon the immediate brightness threshold and upon the course of dark adaptation are presented. Measurements were made following seven adaptation periods of 0 to 40 minutes wearing red goggles under a preadapting brightness of 150 mL. Bu Med Project NM003041.49.01. V. 9, 1950, p. 258-277. NAV MRL 166.

STUDIES IN RESUSCITATION, by H. G. Swann. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1950. 78p graphs, tables Mi $3.50, Ph $10.00. PB 102920

Resuscitation of dogs from acute anoxia, CO poisoning and obstructive asphyxia was investigated with reference to the efficacy of breathing pumps, minimal oxygen requirement, manual artificial respiration, etc. The course of recovery of the animals during resuscitation was ascertained. Circulatory collapse in anoxic death is due to myocardial, not peripheral vascular, failure. The inadequacy of chest decompression as a resuscitating maneuver was quantitated: it is due to the small tidal volumes induced and to the weak "suction" caused during inspiration. The pressure needed in man for adequate lung ventilation by mouth-to-mouth insufflation is 30cm. H_2O, a very small pressure, easily exerted by man. The signs of death in dogs are summarized. In resuscitation from fulminating or acute anoxia or obstructive asphyxia, recovery is very rapid, but it is relatively slow in CO poisoning. Summaries of the process of death and resuscitation in aircraft accidents and in drowning are made. Contract no. W33-038-ac-14379 with University of Texas Medical Branch. AAF TR 6006.

STUDIES OF HUMAN TOLERANCE FOR EXTREME HEAT. PART III: MENTAL PERFORMANCE UNDER HEAT STRESS AS INDICATED BY ADDITION AND NUMBER CHECKING TESTS, by W. V. Blockley and John Lyman. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1950. 58p graphs, tables Mi $2.75, Ph $7.50. PB 103136

The changes in performance on simple paper and pencil tasks of eight experienced pilots exposed to extreme heat are described, together with the alterations in physiological measures. Experiments were conducted at a single humidity (vapor pressure 0.8 in. Hg) and at three levels of temperature, namely 160°, 200° and 235°F. The duration of each exposure was determined by the ability of the individual to tolerate the heat, and work on the mental problems was continuous during the exposure except for a 15 second rest period in each three minutes. Measures of performance and of physiological change were recorded for each successive three minute period of exposure, so that for the individual both factors could be expressed as functions of the time spent in the experimental environment. Contract no. W-33-038-ac-14504 with University of California. For pt. 1 and II see PB 96804, PB 110069. AAF TR 6022.

SURVEY OF THE BASAL METABOLISM OF ESKIMOS, by Jack Bollerud, James Edwards, Jr. and Robert A. Blakely. U. S. Air Force. Arctic Aero-Medical Laboratory, Ladd Air Force Base, Alaska. Dec 1950. 19p tables Mi $1.75, Ph $2.50. PB 102823

1. Eskimos - Metabolism 2. Metabolism 3. AAF AAL Proj 21-01-020.

Project 21-01-020.

VISUAL PERFORMANCE AS A FUNCTION OF LOW PHOTOPIC BRIGHTNESS LEVELS, by Milton L. Rock. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1950. 34p graphs, tables Mi $2.25, Ph $5.00. PB 102913

This study has as its purpose a systematic investigation of performance on several representative visual perceptual tasks as a function of brightness, at low photopic levels. Four types of tasks were studied: judgment of magnitude of a common illusion (Müller-Lyer;)absolute threshold for horizontal motion of black and white stripes; accuracy of binocular depth perception; and performance on a series of simple addition tasks. Ten subjects, rigorously screened for excellence of vision, served in each of these experiments. Each task was performed at five brightness levels: 0.005 (0.008 for the addition task), 0.01, 0.05, 0.1, and 1.0 foot-lamberts. The results showed for all four experiments a critical brightness level, below which decreases in brightness were associated with increasingly poor performance, and above which increases in brightness produced little or no improvement in performance. Contract no. W-33-038-ac-18317 with University of Rochester. AAF TR 6013.

METALS AND METAL PRODUCTS

AIRCRAFT MATERIAL SPECIFICATION: 28-TON 12 PER CENT CHROMIUM CORROSION-RESISTANT STEEL TUBES. Gt. Brit. Ministry of Supply. Jul 1950. 1p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 103060

1. Steel, Chromium - Corrosion resistance - Gt. Brit. 2. Tubes, Chromium-steel - Corrosion resistance - Gt. Brit. 3. MS DTD MS 97B.

Superseding D.T.D. 97A.

AIRCRAFT MATERIAL SPECIFICATION: 45-TON CHROME-MOLYBDENUM STEEL TUBES (NOT SUITABLE FOR WELDING). Gt. Brit. Ministry of Supply. Jul 1950. 2p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 103063

1. Steel, Chromium-molybdenum - Gt. Brit. 2. Tubes, Chromium-molybdenum - Gt. Brit. 3. MS DTD MS 167A.

Superseding D.T.D. 167.

AIRCRAFT MATERIAL SPECIFICATION: 50-TON 12 PER CENT CHROMIUM CORROSION-RESISTANT STEEL TUBES. Gt. Brit. Ministry of Supply. Jul 1950. 2p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 103062

1. Steel, Chromium - Corrosion resistance - Gt. Brit. 2. Tubes, Chromium-steel - Corrosion resistance - Gt. Brit. 3. MS DTD MS 203B.

Superseding D.T.D. 203A.

AIRCRAFT MATERIAL SPECIFICATION: FREE-CUTTING CORROSION-RESISTANT STEEL (FOR NUTS). Gt. Brit. Ministry of Supply. Aug 1950. 1p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 103061

1. Steel bars, Corrosion resistant - Cutting - Gt. Brit. 2. Nuts, Steel - Manufacture - Gt. Brit. 3. MS DTD MS 715.

AIRCRAFT MATERIAL SPECIFICATION: NICKEL-CHROMIUM HEAT RESISTING ALLOY (WROUGHT) FOR GAS TURBINE BLADES (NIMONIC 80). Gt. Brit. Ministry of Supply. Mar 1950. 3p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N Y. $.30. PB 103065

1. Nickel-chromium alloys, Heat resisting - Gt. Brit. 2. Nimonic 80 (Nickel-chromium alloy) 3. Turbines, Gas - Blades - Gt. Brit. 4. MS DTD MS 725.

AIRCRAFT MATERIAL SPECIFICATION: SOFT ALUMINUM ALLOY SHEETS AND COILS (2% MAGNESIUM). Gt. Brit. Ministry of Supply. Nov 1950. 5p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 103033

1. Aluminum alloys - Standards - Gt. Brit. 2. MS DTD 634.

Reprinted Nov 1950 incorporating amendment no. 1.

BEARING STRENGTHS OF SOME ALUMINUM-ALLOY PERMANENT-MOLD CASTINGS, by E. M. Finley. U. S. National Advisory Committee for Aeronautics. Feb 1951. 13p photos, graphs, tables Mi $1.75, Ph $2.50. PB 102869

Results are presented of bearing tests made to determine bearing ultimate and yield strengths of aluminum-alloy permanent-mold castings of B195-T4,

B195-T6, and 356-T6, and to compare the ratios of bearing to tensile properties obtained with similar data from sand-castings of like material. Two values, one for edge distances of 1.5 times pin diameter and one for edge distances of 2 times pin diameter, are proposed for both the ratio of bearing ultimate to tensile ultimate strength and the ratio of bearing yield to tensile yield strength as a basis for selection of allowable bearing values for the design of B195-T4, B195-T6, and 356-T6 aluminum-alloy permanent-mold castings. NACA TN 2312.

BERICHT ÜBER DIE ENTFERNUNG VON ZINK, MAGNESIUM UND BLEI AUS ALUMINUM DURCH DESTILLATION (DISTILLATION OF ZINC, MAGNESIUM AND LEAD FROM ALUMINUM), by Dr. J. Fischer. Metallgesellschaft A. G., Frankfort, Ger. Sep 1942. 13f graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 103092

1. Aluminum - Reduction - Germany 2. Lead - Recovery - Germany 3. Magnesium - Recovery - Germany 4. Zinc - Recovery - Germany 5. BIOS FR 335 LD 6. Micro BIOS HEC 12293 7. Micro BIOS FD 277/48, Frames 929-940.

Abstract available as PB 103092s. 1p. Mi $1.25, Ph $1.25. Report no. 1934. Listed in BIOS FR 335, appendix.

EXPOSURE TESTS OF GALVANIZED-STEEL-STITCHED ALUMINUM ALLOYS, by Fred M. Reinhart. U. S. National Advisory Committee for Aeronautics. Feb 1951. 14p photos Mi $1.75, Ph $2.50. PB 102903

Sheets of 24S-T3 and alclad 24S-T3 aluminum alloys joined to themselves by stitching with galvanized steel wire were exposed in a marine atmosphere and in the tidewater to determine whether they would have a satisfactory service life in these environments. Both alloys joined by this method are satisfactory with respect to corrosion resistance for service in marine atmospheres. The alclad 24S-T3 alloy is satisfactory for short periods of time, where the installation is subject to frequent wetting by sea water. The use of 24S-T3 sheet joined by stitching with galvanized wire is not satisfactory when subject to wetting by sea water. NACA TN 2299.

GENERAL METALLURGY (AMERICAN FIAT REVIEW OF GERMAN SCIENCE 1939-1946, v. 31) TRANSLATED, EDITED, AND PUBLISHED IN COOPERATION WITH THE OFFICE OF TECHNICAL SERVICES, DEPT. OF COMMERCE BY THE O. W. LEIBIGER RESEARCH LABORATORIES, INC., by Max Hansen and others. Nov 1950. 400p tables Available from O. W. Leibiger Research Laboratories, Inc., Petersburg, N. Y. $5.30. PB 85010t

Translation of PB 85010.

INDUKTIVE WARMBEHANDLUNG IN DER STAHL-VERARBEITENDEN INDUSTRIE (INDUCTIVE HEAT TREATMENT IN THE STEEL INDUSTRY), by G. Seulen. Elotherm Werke, Remscheid, Ger. Jun 1944. 15f photos, drawings, graphs (Text in German) Mi $1.75, Enl Pr $3.75. PB 102953

1. Steel - Heat treatment - Germany 2. Heat treatment, Inductive - Research - Germany 3. Elotherm process (Heat treatment) 4. Micro BIOS FD 243/50, Frames 1-14.

English abstract included. Abstract available as PB 102953s. 1p. Mi $1.25, Ph $1.25.

JOINING SHEET METAL PARTS, IMPROVED METHODS IN, I. U. S. Bureau of Ships. Nov 1950. 14p photos, diagrs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.25. PB 102897

1. Aluminum - Soldering 2. Sheet metal - Brazing 3. Sheet metal - Soldering 4. Solders, Aluminum 5. Aluminum - Brazing 6. NAVSHIPS IN 110.

See also PB 101973 and PB 102424.

MANUFACTURE OF TITANIUM ALLOYS, BY L. S. BUSCH AND R. H. DICKINSON. REPORT NO. 5, SEP 30, 1949 TO AUG 3, 1950, FINAL REPORT ON CONTRACT NO. NOA(S)-10683. Mallory, P. R. & Co., Inc., Indianapolis, Ind. Aug 1950. 64p tables (part fold) Mi $3.00, Ph $8.75. PB 102870

The work covers the melting practice in a resistance furnace with an argon atmosphere and the determination of the physical properties of binary, ternary and quaternary titanium alloys containing aluminum, beryllium, boron, columbium, copper, chromium, indium, iron, manganese, nitrogen, oxygen, silicon, silver, tungsten, vanadium and zirconium. The properties of the 3% aluminum - 5% chromium - titanium alloy were investigated after various heat treatments. Tensile properties, impact data and fatigue strength as forged and heat treated were obtained. Alloy additions were made in the form of wire, lumps or powder and as elements, master alloys or ferre-alloys. A maximum addition of 10% alloying agents was made. Spectrographic methods were set up for determining the aluminum and chromium contents of titanium alloys. Large 3% aluminum - 5% chromium - titanium ingots were forged and a general forging practice has been set up. Tables of various data concerning the alloys of titanium are presented in this report. See also PB 100,000 for final report on earlier contract.

PROCESS SPECIFICATION: ELECTROPLATING OF ALUMINUM, STEEL AND COPPER WITH SILVER AND NICKEL. Gt. Brit. Ministry of Supply. Jul 1950. 4p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 103064

1. Aluminum - Electroplating - Silver - Gt. Brit. 2. Aluminum - Electroplating - Nickel - Gt. Brit. 3. Steel - Electroplating - Silver - Gt. Brit. 4. Steel - Electroplating - Nickel - Gt. Brit. 5. Copper - Electroplating - Silver - Gt. Brit. 6. Copper - Electroplating - Nickel - Gt. Brit. 7. Electroplating, Nickel - Gt. Brit. 8. Electroplating, Silver - Gt. Brit. 9. MS DTD MS 919.

REPORT OF VISIT TO ENGLAND AND SCOTLAND, by Finn Jonassen. U. S. National Research Council. Committee on Ship Steel. Apr 1950. 68p photos, diagrs, drawings, graphs, tables Mi $3.00, Ph $8.75. PB 102804

1. Steel - Gt. Brit. 2. Shipyards - Gt. Brit. 3. Shipbuilding - Gt. Brit. 4. Vulcan (Steamship) - Tests 5. Ships - Structural failures - Gt. Brit. 6. Ships - Stresses - Gt. Brit. 7. Schnadt test.

RESISTANCE OF ALUMINUM AND BERYLLIUM BRONZES TO FATIGUE AND CORROSION-FATIGUE, by D. G. Sopwith. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1940. 8p photos, graphs, tables Available from British In-

formation Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 102859

The investigation of the fatigue and corrosion-fatigue resistance of special bronzes is extended to include (1) aluminium bronze (D.T.D. 160), (2) beryllium bronze (2.25 per cent. Be,) each in two heat-treated conditions. In neither material is the fatigue or corrosion-fatigue resistance appreciably higher in the heat-treated condition than in the condition as received. The fatigue strength in air of the beryllium bronze is almost independent of the ultimate stress, which varied from 32 to 81 ton/in. Continuation of paper by Gough, H. J. and Sopwith, D. G. Resistance of some special bronzes to fatigue and corrosion-fatigue, issued in J. Inst. Met. 160, p. 143. (1937). S.O. Code no. 23-2486. ARC RM 2486.

TRANSVERSE CONTRACTIONS AND REACTION STRESSES IN BUTT WELDED MILD STEEL PLATES, BY R. WECK. SUBMITTED by Professor J. F. Baker. Gt. Brit. Admiralty Ship Welding Committee. Jan 1947. 107p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.40. PB 103067

The work described in this Report, has disclosed no evidence that such brittle fractures can occur spontaneously in a ductile material under the influence of residual stresses alone. There is no reason to suppose however, that in the presence of a notch, and at a sufficiently low temperature, a notch-brittle material would not fracture in a brittle manner under residual stress as it would under any other type of stress. Publishing date is 1950. S.O. Code no. 20-148. (SO 2502). ASWC R 4.

METEORALOGY AND CLIMATOLOGY

EFFECT OF QUADRATIC TERMS IN DIFFERENTIAL EQUATIONS OF ATMOSPHERIC OSCILLATIONS, by C. L. Pekeris. U. S. National Advisory Committee for Aeronautics. Mar 1951. 10p graphs Mi $1.25, Ph $1.25. PB 103137

It is shown that the neglect of the terms in the differential equations of atmospheric oscillations which are quadratic in the velocities is not justified in the case of free oscillations for heights greater than about 100 kilometers. This result is illustrated for two atmospheres of different temperature distributions where it is shown that at about 130 kilometers the neglected quadratic terms become equal to the retained linear terms and that they even exceed the latter at heights greater than 130 kilometers. A method is outlined for including the quadratic terms in the theory of atmospheric oscillations. The bearing of this result on atmospheric tides is discussed. NACA TN 2314.

METEOROLOGICAL ANALYSIS OF ICING CONDITIONS ENCOUNTERED IN LOW-ALTITUDE STRATIFORM CLOUDS, by Dwight B. Kline and Joseph A. Walker. U. S. National Advisory Committee for Aeronautics. Mar 1951. 27p graphs, tables Mi $2.00, Ph $3.75. PB 103050

Liquid-water content, droplet size, and temperature data measured in predominantly stratiform clouds during the 1948-49 and 1949-50 winters are presented. The horizontal and vertical extent of icing conditions and the relation of the existence of supercooled clouds to cyclone areas and precipitation regions are indicated. Liquid-water content measurements during 12 flights are shown in relation to theoretical amounts calculated from radiosonde data and cloud depth observations. NACA TN 2306.

METHOD OF MEASURING THE SIGNIFICANT CHARACTERISTICS OF A SNOW-COVER, by G. J. Klein, D. C. Pearce and L. W. Gold. National Research Council of Canada. Associate Committee on Soil and Snow Mechanics. Nov 1950. 63p photos, drawings, tables Mi $3.00, Ph $8.75. Also available from National Research Council of Canada, Ottawa, Canada. $.90. PB 102990

The objective of the survey was to determine the limiting characteristics of the snow types encountered at the selected locations. Technical memorandum no. 18. This report supersedes Technical memorandum no. 5, and Division of Mechanical Engineering Reports MM-192 and MM-202. NRCC 2269.

PROJECT CIRRUS. OCCASIONAL REPORT NO. 11: THE POSSIBILITY OF MODIFYING LIGHTNING STORMS IN THE NORTHERN ROCKIES, by Vincent J. Schaefer. General Electric Co. Research Laboratory, Schenectady, N. Y. Feb 1949. 11p Mi $1.75, Ph $2.50. PB 103177

1. Clouds - Seeding 2. Lightning - Protection 3. GE RL 134 4. SIG Contract W-36-039-sc-38141, Occasional report no. 1.

First occasional report issued under Contract no. W-36-039-sc-38141. Dept. of the Army project: 3-99-07-022. Signal Corps project: 172B.

PROJECT CIRRUS. OCCASIONAL REPORT NO. 21: PROGRESS IN CLOUD MODIFICATION BY PROJECT CIRRUS, PREPARED by Irving Langmuir. General Electric Co. Research Laboratory, Schenectady, N. Y. Apr 1950. 28p diagrs, tables Mi $2.00, Ph $3.75. PB 102817

1. Clouds - Formation 2. Rain, Simulated 3. Silver iodide 4. SIG Contract W-36-039-sc-38141 Report no. 11. 5. GE RL 357.

Eleventh occasional report uncer Contract no. W-36-039-sc-38141.

PROJECT CIRRUS. OCCASIONAL REPORT NO. 25: STUDIES OF TROPICAL CLOUDS, by Irving Langmuir. General Electric Co. Research Laboratory, Schenectady, N. Y. Jul 1950. 21p Mi $2.00, Ph $3.75. PB 103178

1. Clouds - Formation 2. GE RL 365 3. SIG Contract W-36-039-sc-38141 Occasional report no. 15.

Fifteenth occasional report under Contract no. W-36-039-ac-38141. Dept. of the Army project: 3-99-07-022. Signal Corps project: 172B.

MINERALS AND MINERAL PRODUCTS

BETONITE AND BLEACHING CLAY IN JAPAN, by Donald E. Lee. Supreme Commander for the Allied Powers. Natural Resources Section. Jan 1951. 30p photo, maps, diagrs, table Mi $2.00, Ph $3.75. PB 103046

1. Bentonite - Production - Japan 2. Clay, Bleaching - Manufacture - Japan 3. SCAP NRS 139.

BLOWING, POPPING OR PITTING OF INTERNAL PLASTER. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Jan 1951. 4p photos Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.05. PB 103032

1. Plaster - Defects - Gt. Brit. 2. DSIR BRD 26.

COMPRESSIVE STRENGTH OF LIGHT WEIGHT CEMENTS WHEN SET UNDER HIGH PRESSURES, by Foster L. White. 1949. 94p photos, diagr, graphs, tables Mi $4.25, Ph $12.50. PB 102835

A study has been conducted to determine whether light weight cements might be designed which would develop sufficient strength under simulated well bore conditions of pressure and water loss to warrant their use in oil-field work. It is believed that it should be possible to design a cement slurry which would give better results than the choice of slurries presently available. This selection would depend upon conditions at the individual wells. A secondary objective was to develop a better method for evaluation of cement performance and to present a criteria upon which future research may be based. Expanded perlite was the only one of the materials tested which offered the desired characteristics for a light weight cement. Thesis-University of Tulsa.

DECOMPOSITION OF MONAZITE SAND AND SEPARATION OF RARE EARTHS. Auergesellschaft A. G., Berlin. Oct 1946. 23f (Text in German and English) Mi $2.00, Enl Pr $5.00. PB 102955

1. Earths, Rare - Separation - Germany 2. Monazit - Decomposition - Germany 3. Thorium nitrate - Manufacture - Germany 4. Micro BIOS FD 1363/49, Frames 1-22.

English abstract included. Abstract available as PB 102955s. 1p. Mi $1.25, Ph $1.25. Includes letter in English from Dr. Ihwe of the rare earths factory.

KERAMISCHE WERKSTOFFE FÜR HOCHTEMPERATURBEANSPRUCHTE MASCHINENTEILE (CERAMIC MATERIALS FOR MACHINE PARTS SUBJECTED TO HIGH TEMPERATURES). Germany. Zentrale für Wissenschaftliches Berichtswesen der Luftfahrtforschung. Mar 1944. 72f photos, drawings, graphs, tables (Text in German) Mi $3.50, Enl Pr $11.25. PB 103093

1. Ceramic materials - Thermal properties - Germany 2. Refractory materials - Thermal properties - Germany 3. Silicon carbide - Thermal properties - Germany 4. Turbines - Blades - Materials - Germany 5. Adhesives - Ceramic to metal - Germany 6. BIOS FR 1569 LD 7. ZWB UM 785 8. Micro BIOS FD 443/48, Frames 1-77.

Abstract available as PB 103093s. 2p. Mi $1.25, Ph $1.25. For translation of article by R. Schmid see PB 87848. Listed in BIOS FR 1569. Papers presented at a conference at Braunschweig Mar 21, 1944. Contents: Arbeiten auf dem gebiete der keramischen werkstoffe (Work on ceramic materials), by A. Schütte. - Innere spannungen und risse beim schwinden erstarren und abkühlen des porzellans (Internal stresses and cracks through shrinking, hardening and cooling of porcelain), by A. Scharf. - Einfluss von betriebstemperatur und werkstoff an die turbinenentwicklung (Influence of operating temperature and materials on the development of turbines), by E. Schmidt. - Gestaltungsfragen bei turbinen mit keramischen schaufeln (Problems in construction of turbines with ceramic vanes), by W. Kalisch. - Verbindungen zwischen metall und keramik (Bonding of metals and ceramics), by E. Söhngen. - Warmfeste metallkeramische werkstoffe (Heat resisting metals - mixed ceramic materials), by E. Meyer-Hartwig. - Festigkeits prüfmethoden für hohe temperaturen und ergebnisse (Strength-testing methods for high temperature, and results), by B. Dirksen. - Eignung oxydkeramischer werkstoffe für den gasturbinenbau (Suitability of ceramics based on oxide for blades in gas turbines), by R. Oettel. - Über die warmfestigkeit von silicumkarbidmassen (Heat resistance of silicon carbide), by Gerhard Müller.

ORDNANCE AND ACCESSORIES

INVESTIGATION INTO THE PROPOGATION (1) OF HIGH PRESSURE WAVES IN AN AIR COLUMN, by George D. Carnahan and John T. Andrews, Jr. Jun 1949. 38p photos, graphs Mi $2.25, Ph $5.00. PB 102882

An investigation was made of the propagation of a high pressure wave as it travels through a circular tube. The problem is of interest because of the behavior of high pressure waves in batch type processes. Following a theoretical analysis of the behavior of the high pressure wave, a series of actual tests were performed in which the high pressure effects were measured. The results obtained by theoretical development were compared with the actual results through curves. It was found that the actual data taken checks fairly well with the theory developed. The analytical discussion neglects any effect of wall forces in the process. The actual measurements appear to differ from the theoretical only by an amount attributable to the wall forces present. Thesis-Rensselaer Polytechnic Institute.

LETTERS TO AIR ATTACHE, AMERICAN EMBASSY, ROME (MAJOR E. STOLL) CONCERNING NEW EXPLOSIVE KNOWN AS "G", by Antonio Giordano. Jan 1949. 7p (Text in Italian) Mi $1.25, Ph $1.25. PB 102836

Information is given on an Italian-developed highly destructive explosive consisting of acetaldehyde, formaldehyde, acetone, methyl alcohol, nitric and sulfuric acid and a catalyzer. The explosive is not yet fully developed and it seems that it is still inferior to other better known explosive compounds.

PACKING AND PACKAGING

DEVELOPMENT OF THE PLASTIC BLEACH CONTAINER, by Fred B. Shaw, Jr. U. S. Chemical Corps Technical Command, Army Chemical Center, Md. Jan 1951. 46p photos, drawings (6 fold) Mi $2.50, Ph $6.25. PB 103103

1. Containers, Chemical 2. Bleaching agents - Storage 3. CC TCIR 626 4. Army Spec 97-54-96.

TCIR 626. Technical Command interim report. Project 4-91-06-001. U. S. Army Specification 97-54-96.

ENTWURF VON RICHTLINIEN FÜR LAGERUNG, PFLEGE, VERWENDUNG UND BESTANDSÜBERWACHUNG VON FLUG-BETRIEBSTOFF-FÄSSERN (GERMAN AIR FORCES MANUAL ON STORAGE, CARE AND INVENTORY OF AVIATION FUEL DRUMS). Germany. Reichsluftfahrtministerium. Dec 1950. 51p fold table Mi $2.75, Ph $7.50. PB 102942

1. Fuels, Aviation - Storage - Germany 2. Containers, Fuel - Drum - Maintenance and repair - Germany 3. Tanks, Fuel - Maintenance and repair - Germany 4. Tanks, Fuel - Storage - Germany 5. STS 96.

Deutsche luft 3507.

PERSONNEL APTITUDE TESTING

INVESTIGATION OF PSYCHIATRIC SCREENING TESTS IN THE UNITED STATES NAVY, by Milton Wexler. 1948. 266p tables Mi $9.00, Ph $33.75. PB 103044

1. Psychiatric tests 2. NAVPERS 18226.

Thesis-Columbia University.

PILOT CANDIDATE SELECTION RESEARCH PROGRAM: IMPLEMENTATION PROCEDURES, by Robert B. Payne. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas and U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida. Dec 1950. 9p tables Mi $1.25, Ph $1.25. PB 102695

1. Pilots, Air - Psychological tests 2. Pilots, Air - Selection 3. AAF SAM Proj 21-29-008, Report no. 2 4. NMRI Proj NM001057 R 2.

Joint project report no. 2. For joint project report no. 1 see PB 101956.

VALIDITY OF THE AIRMAN CLASSIFICATION BATTERY AC-1, by Donald B. Gragg and Mary Agnes Gordon. U. S. Air Force. Human Resources Research Center, Lackland Air Force Base, San Antonio, Texas. Dec 1950. 256p graph, tables Mi $9.00, Ph $32.50. PB 102929

1. Personnel, Flying - Classification 2. AC-1 (Airman Classification Battery) 3. AAF HRRC RB 50-3.

Project no. 21-03-012.

PHOTOGRAPHIC AND OPTICAL GOODS

USE OF MICROORGANISMS IN DEVELOPING A PHOTOGRAPHIC PROCESS, by Wesley N. Tiffney. Boston University. Optical Research Laboratory, Boston, Mass. Jul 1949. 23p Mi $2.00, Ph $3.75. PB 102827

A review is presented of existing literature pertinent on the photosensitivity of microorganisms for use in photography. It was shown that the effect of ultraviolet light on microorganisms, varies not only from genus to genus, but apparently within a single species of an organism. Species of bacteria which are highly susceptible to the lethal action of ultraviolet, are selected, and by the use of selected subcultures, it is possible to isolate a very susceptible strain. Ultraviolet light research and selection, if coupled with the photodynamic action of dyes, should yield a photosensitive material, based on bacteria, such as, serratia marcescens. Technical note no. 57. Contract no. W33-038-ac-14075.

PHYSICS

General

APPROXIMATE SOLUTION OF THE EQUATION OF SUPERSONIC FLOWS OF GAS, TRANSLATED BY R. F. CLIPPINGER, BALLISTIC RESEARCH LABORATORIES, ABERDEEN PROVING GROUND, MD., by S. A. Christianovich. 1947. 14f graphs, table Mi $1.75, Enl Pr $3.75. PB 102979

1. Dynamics, Gas - Theory - Russia 2. Flow, Supersonic - Russia 3. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. 4. AAF T-2 T/1220-1-A.

Translation from Prikladnaiia matematika e mechanika XI 1947. Russian title and original not included.

ASIMPTOTICHESKOYE RAZLOJENIYE FUNKTSII CHAPLYGINA (ASYMPTOTIC RESOLUTION OF CHAPLYGIN S FUNCTIONS), by F. I. Frankl. 1947. 10f Mi $1.25, Enl Pr $2.50. PB 102972

1. Flow, Subsonic - Russia 2. Flow, Supersonic - Russia 3. Dynamics, Gas - Russia 4. Chaplygin's functions 5. AAF T-2 T/1212-1A 6. GDAM A-9-T-31.

Translated from Transactions of Acad. Science USSR v. 58, no. 5, by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9-T-31.

AUFTRETEN EINES VERDICHTUNGSSTOSSES IN DER NACHBARSCHAFE EINER KONVEXEN SINGULÄRITENFREIEN WANDKONTUR (SHOCK WAVES OCCURRING IN THE VINCINITY OF A CONVEX BODY IN SUPERSONIC FLOW), by Manfred Schafer. Jul 1944. 32f graphs (Text in German and English) Mi $2.25, Enl Pr $6.25. PB 102971

1. Flow, Supersonic - Germany 2. Shock waves - Germany 3. Meyer, Charles A. & Co., New York 4. AAF T-2 T/2579 RE 5. AAF T-2 T/1206-1A.

Translated from Technische Hochschule, Dresden. Peenemunde archiv 44/12b.

ENVELOPPENBILDING KRUMMLINIGER MACHSCHER WELLEN BEI STRÖHMUNG LÄNGS EINER KONVEXEN WAND (FORMATION OF ENVELOPES OF CURVED MACH WAVES IN FLOW ALONG A CONVEX WALL), by M. Schaefer. May 1944. 76f diagrs (Text in German and English) Mi $3.50, Enl Pr $11.25. PB 102969

1. Boundary layer - Germany 2. Dynamics, Gas - Theory - Germany 3. Mach number - Effect - Germany 4. Brown University. Graduate Division of Applied Mathematics 5. AAF T-2 T/1203-1A 6. GDAM A-9-T-13.

Translated from Peenemunde archiv 44/12a, by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9 T-13.

OBTEKANIYE ELLIPSA PLOSKO-PARALLELNIM POTOKOM GAZA (PLANE PARALLEL GAS FLOWS PAST AN ELLIPSE), by L. K. Kudriashov. 1947. 33f graph (Text in Russian and English) Mi $2.25, Enl Pr $6.25. PB 102970

1. Flow, Subsonic - Russia 2. Flow, Incompressible - Theory - Russia 3. Brown University. Graduate Division of Applied Mathematics 4. AAF T-2 T/1208 -1A.

Translated from Prikladnaiia matematika e mechanika XI 1947, p. 119-128, by Brown University under Contract W33-038-ac-15004 (16351).

ON THE TRANSITION FROM A TRANSONIC POTENTIAL FLOW TO A FLOW WITH SHOCKS (PROJECT NO. HA-219), by G. Guderley. U. S. Air Materiel Command, Wright Field, Dayton, Ohio. Aug 1947. 54f graphs Mi $2.75, Enl Pr $8.75. PB 102965

1. Flow, Transonic 2. Shock waves - Computations 3. AAF T-2 T/2160 ND.

Some frames will not reproduce well.

RASPREDELENI YE DAVLENIYA PO TELAM VRASHCHENIYA PRI OPTEKANIYA GAZOM S BOLSHIMI DOZVUKOVYMI SKOROSTYAMI (PRESSURE DISTRIBUTION ON BODIES OF REVOLUTION IN HIGH SUBSONIC GAS FLOWS), by I.I. Eterman. 1947. 30f graphs (Text in Russian and English) Mi $2.00, Enl Pr $5.00. PB 102967

1. Flow, Supersonic - Russia 2. Aerodynamics - Theory - Russia 3. Pressure distribution - Formulas - Russia 4. Brown University. Graduate Division of Applied Mathematics 5. AAF T-2 T/1222-1A.

Translated from Prikladnaiia matematika e mechanika XI, 1947, p. 363-369, by Brown University under Contract W33-038-ac-15004 (16351).

RECHENVERFAHREN ZUR LÖSUNG HOCHGRADIG STATISCH UNBESTIMMTER SYSTEME NACH DER METHODE DER FESTPUNKTE (CALCULATION METHOD FOR THE SOLUTION OF HIGH-GRADED STATICALLY UNDETERMINED SYSTEMS ACCORDING TO THE METHODS OF THE FIXED POINTS), by W. Bergmann. Germany. Luftfahrtforschungsanstalt. n.d. 82f diagrs, tables (Text in German) Mi $3.75, Enl Pr $12.50. PB 102959

1. Mathematical equations and solutions - Germany 2. Statistics - Graphic methods - Germany 3. Micro GDC/2474 4. Micro BIOS FD 2228/48, Frames 1-75.

R. and T. 755. Abstract available as PB 102959s. 2p. Mi $1.25, Ph $1.25.

SOPROTIVLENIYE STRELOVIDNOGO KRILA PRI SVERHZVOOKOVIH SKOROSTIAH (DRAG OF A DELTA WING IN SUPERSONIC FLOW), by E. A. Karpovich and F. I. Frankl. 1947. 8f diagrs Mi $1.25, Enl Pr $2.50. PB 102983

1. Wings, Triangular - Aerodynamics - Russia 2. Flow, Supersonic - Russia 3. Brown University. Graduate Division of Applied Mathematics 4. GDAM A-9-T-12.

Translated from Prikladnaiia matematika e mechanika XI 1947, p. 495-496, by Brown University. GDAM A-9-T-12.

ZUR THEORIE DER ELLIPTISCHEN INTEGRALE. (ON THE THEORY OF ELLIPTICAL INTEGRALS), by Carl Heuman. 1950. 57p diagrs, tables (Text in German) Mi $2.75, Ph $7.50. PB 102932

1. Elliptic functions - Germany 2. Mathematical functions - Germany 3. Acta polytechnica no. 60, 1950 4. Sweden. Kungl. Tekniska Högskolan. Handlingar no. 32, 1950.

Physics and Applied Mathematics series Vol. 1, no. 7.

ZUSAMMENHANG ZWISCHEN WANDKRÜMMUNG UND STOSSFRONTKRÜMMUNG BEI EBENER GASSTRÖMUNG (CONNECTION BETWEEN WALL CURVATURE AND SHOCK WAVE CURVATURE IN TWO-DIMENSIONAL GAS FLOWS), by Manfred Schaefer. Oct 1943. 42f diagr (Text in German and English) Mi $2.50, Enl Pr $7.50. PB 102968

1. Flow, Two-dimensional - Germany 2. Shock waves - Gases - Germany 3. Surfaces - Curvature - Effect on shock waves - Germany 4. Brown University. Graduate Division of Applied Mathematics 5. AAF T-2 T/1202-1A 6. ZWB UM 3193 7. GDAM A-9-T-9.

Translated from Peenemunde archiv 44/8, by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9-T-9.

RUBBER AND RUBBER PRODUCTS

METHODE ZUR DYNAMISCHEN PRÜFUNG VON SCHWEISS- UND HAFTVERBÄNDEN (DYNAMICAL TESTING METHOD FOR WELDED AND ADHESIVE BONDS), by Huth. I. G. Farbenindustrie A. G., Schkopau, Ger. Jun 1940. 12f photos, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 110379

1. Rubber, Synthetic - Adhesive properties - Germany 2. Rubber, Synthetic - Welding properties - Germany 3. Micro BIOS FD 1328/48, Frames 1-11.

English abstract included. Abstract available as PB 110379s. 1p. Mi $1.25, Ph $1.25.

OZONE AGING OF POLYMERS, by Z. T. Ossefort. U. S. Arsenal, Rock Island, Ill., Laboratory. Oct 1949. 31p photos, graph, tables Mi $2.25, Ph $5.00. PB 102831

A method for testing the ozone resistance of various polymers has been developed and utilized in the evaluation of protective coatings for rubber. A decrease in modulus test is used to measure the effect of ozonation on the various rubber specimens. The modulus of the test specimens is reduced by the cracking produced by ozone. The protective coatings found to be most resistant to attack by ozone were neoprene, polyisobutylene, pliolite S4, and Vanderbilt Blackout Black. Project no. TB4-501. RIAL R3.

STRUCTURAL ENGINEERING

ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF EFFECT OF TWIST ON VIBRATIONS OF CANTILEVER BEAMS, by Alexander Mendelson and Selwyn Gendler. U. S. National Advisory Committee for Aeronautics. Mar 1951. 48p diagrs, graph, tables Mi $2.50, Ph $6.25. PB 103109

An analytical and experimental investigation was made of the effect of twist on the vibrations of cantilever beams. General equations are developed for the coupled bending - bending-torsion vibrations of a

cantilever beam. The use of tabulated Station Numbers makes the analytical method presented particularly simple to apply. NACA TN 2300.

CRITICAL STRESS OF RING-STIFFENED CYLINDERS IN TORSION, by Manuel Stein, J. Lyell Sanders, Jr., and Harold Crate. U. S. National Advisory Committee for Aeronautics. Sep 1949. 10p graphs, tables Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.15. PB 103181

A chart in terms of nondimensional parameters is presented for the theoretical critical stress in torsion of simply supported cylinders stiffened by identical equally spaced rings of zero torsional stiffness. The results are obtained by solving the equation of equilibrium by means of the Galerkin method. Comparison of the theoretical results with experimental results indicates that ring-stiffened cylinders buckle, on the average, at a buckling stress about 15 percent below the theoretical buckling stress. Cover date is 1950. NACA Report 989.

FARM BUILDINGS FOR SCOTLAND, BY A COMMITTEE APPOINTED BY THE SECRETARY OF STATE FOR SCOTLAND, by William C. Davidson, Chairman. Gt. Brit. Secretary of State for Scotland. Committee on Farm Buildings for Scotland. 1946. 146p drawings (7 fold) Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 103070

1. DSIR PWBS 22.
S.O. Code no. 70-441-22-50.

GRANOLITHIC CONCRETE FLOORS. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Nov 1950. 4p Available from British Information Services, 30 Rockefeller Center, New York 20, N. Y. $.05. PB 103034

1. Concrete, Granolithic - Gt. Brit. 2. Floors, Concrete - Gt. Brit. 3. DSIR BRD 24.

OSNOVNYE DIFFERENTSIALNYE URAVNENIA OBSHCHE TEORII UPRÜGIKH OBOLOCHEK (BASIC DIFFERENTIAL EQUATIONS IN GENERAL THEORY OF ELASTIC SHELLS), by V. S. Vlasov. Feb 1951. 58p diagrs, tables Mi $2.75, Ph $7.50. PB 102868

Starting with the equations of three-dimensional elasticity, accurate theories for the stress analysis of thick shells are derived. The general theory is applied to the special cases of cylindrical and spherical shells. Further it is shown how these results reduce in the limit to the classical theories of thin plates and shells. Translation from Prikladnaia matematika i mekhanika v. 8, 1944. NACA TM 1241.

PRODUCTIVITY IN HOUSE-BUILDING: PILOT SAMPLE SURVEY IN THE SOUTH, EAST AND WEST OF ENGLAND AND IN SOUTH WALES, AUGUST 1947 - OCTOBER 1948. Gt. Brit. Ministry of Works. 1950. 33p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 103068

1. Houses - Construction - Statistics - Gt. Brit. 2. DSIR NB SR 18.
S.O. Code no. 70. 650

SELECTION OF CLAY BUILDING BRICKS. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Dec 1950. 4p Available from British Information Services, 30 Rockefeller Center, New York 20, N. Y. $.05. PB 103035

1. Bricks, Clay - Gt. Brit. 2. DSIR BRD 25.

SOUND INSULATION AND ACOUSTICS, BY THE ACOUSTICS COMMITTEE OF THE BUILDING RESEARCH BOARD. G. B. Sharples, Chairman. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Board. Committee on Sound Insulation and Acoustics of Buildings. 1944. 82p diagrs, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 103069

1. Insulation, Sound - Buildings - Gt. Brit. 2. Insulation, Acoustic - Buildings - Gt. Brit. 3. Acoustic systems - Gt. Brit. 4. Auditoriums - Acoustic systems - Gt. Brit. 5. DSIR PWBS 14.
Reprinted 1950. S.O. Code no. 70-441-14-50.

TEST WALLS FOR ASSESSING CONSTRUCTION TIMES WITH NEW BUILDING BLOCKS, by W. Kinniburgh. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Apr 1950. 15p photos, drawings, graph, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.25. PB 103072

1. Walls - Tests - Gt. Brit. 2. Blocks, Building - Gt. Brit. 3. DSIR NB TP 9.
S.O. Code no. 47-551-9.

TEXTILES AND TEXTILE PRODUCTS

BACTERIOLOGICAL RETTING OF RAMIE, FLAX AND TROPICAL FIBERS - NEW FRENCH PROCESS, by Seymour M. Finger. U. S. Embassy, Paris, France. Jan 1951. 13p table Mi $1.75, Ph $2.50. PB 103184

1. Clostridium corallinum 2. Flax - Retting - France 3. Ramie - Retting - France 4. Textile fibers - Processing - France 5. Retting agents, Bacteriological - France 6. Prevot-Reynaud retting process.

Accompanied by three enclosures: No. 1. Prevot-Raynaud process for the bacteriological retting of textile plants (From Institut Pasteur). - No. 2. Description of industrial tests of retting flax by Prevot-Raynaud process (From report by Mr. Bui-Xuan-Nhuan.) - No. 3. Solution of the ramie question by new methods of cultivation and processing (excerpt) by Gustav Lefevre.

DECOMPOSITION OF CYSTINE AND WOOL BY BALL-MILLING AND AUTOCLAVING, by William H. Stahl, Bernard McQue and R.G.H. Siu. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. May 1948. 9p tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.25. PB 103036

Quantitative data with regard to cystine, sulfur and nitrogen are presented on both wool and cystine that have been subjected to ball-milling and autoclaving. In both cases ammonia, hydrogen sulfide, cysteine and sulfate were detected. The suggestion is made that these compounds resulted from the simultaneous hydrolytic and oxidative reactions on the wool proteins, with heat production increasing the rate. QMC RR BS 1.

TENSILE RECOVERY BEHAVIOR OF TEXTILE FIBERS, by George Susich and Stanley Backer. U.S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. Nov 1950. 59p photos, graphs (1 fold), tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.50. PB 103038

This report describes the tensile recovery of 25 samples representing 16 different fiber materials covering a wide range of extensibility, tenacity, and recovery. The experiments were performed on the new, electronically controlled Instron Tensile Tester, using a cycling technique developed by the authors for this purpose. The materials studied are characterized on the basis of the percentage of their total elongation which recovers immediately, that which recovers after a defined time period, and that which remains permanently. This concept makes possible a valid comparison among different textile materials which can assist in the selection of proper fibers for specific end uses. QMC TSR 64.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

ANALYSIS OF SPANWISE TEMPERATURE DISTRIBUTION IN THREE TYPES OF AIR-COOLED TURBINE BLADES, by John N. B. Livingood and W. Byron Brown. U. S. National Advisory Committee for Aeronautics. Mar 1950. 22p diagrs, graphs Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.20. PB 103084

Methods for computing spanwise blade-temperature distributions are derived for air-cooled hollow blades, air-cooled hollow blades with inserts, and air-cooled blades containing internal cooling fins. Individual and combined effects on spanwise blade-temperature distributions of cooling-air-temperature change due to heat transfer and rotation, radiation, and radial heat conduction are determined. An approximate method for determining the allowable stress-limited blade-temperature distribution is included, with brief accounts of a method for determining the maximum allowable effective gas temperatures and the cooling-air requirements. Numerical examples that illustrate the use of the various temperature-distribution equations and of the nondimensional charts are also included. NACA Report 994.

ANNUAL REPORT, 33D, 1947, INCLUDING TECHNICAL REPORTS NOS. 863-891. U. S. National Advisory Committee for Aeronautics. 1950. 627p photos, drawings, diagrs, graphs, tables Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $4.50. PB 103087

1. Aeronautical research 2. Aeronautics - Yearbooks 3. NACA 863-891.

ANNUAL REPORT, 36TH, 1950. ADMINISTRATIVE REPORT WITHOUT TECHNICAL REPORTS. U. S. National Advisory Committee for Aeronautics. Jan 1951. 74p photos Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.40. PB 103054

1. Aeronautical research 2. Aeronautics - Yearbooks.

C-118A AIRPLANE ENGINEERING INSPECTION, by Charles Castellano. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1951. 3p Mi $1.25, Ph $1.25. PB 102976

1. Airplanes - Inspection 2. C-118A (Airplane) 3. Douglas Aircraft Company, Inc., Santa Monica, Cal. 4. AAF TSEAA MR S2-2.

C-121C AIRPLANE ENGINEERING INSPECTION, by Charles Castellano. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1951. 3p Mi $1.25, Ph $1.25. PB 103002

1. Airplanes - Inspection 2. C-121C (Airplane) 3. Lockheed Aircraft Corporation, Burbank, Cal. 4. AAF TSEAA MR S2-3.

CHARTS FOR ESTIMATION OF LONGITUDINAL-STABILITY DERIVATIVES FOR A HELICOPTER ROTOR IN FORWARD FLIGHT, by Kenneth B. Amer and F. B. Gustafson. U. S. National Advisory Committee for Aeronautics. Mar 1951. 51p diagr, graphs Mi $2.75, Ph $7.50. PB 103083

Charts are presented that provide a convenient means for obtaining the longitudinal-stability derivatives (except those with respect to pitching velocity) of a helicopter rotor in forward flight. These charts do not rely upon the often-used assumption that the rotor resultant-force vector is perpendicular to the tip-path plane. NACA TN 2309.

CORRESPONDENCE FLOWS FOR WINGS IN LINEARIZED POTENTIAL FIELDS AT SUBSONIC AND SUPERSONIC SPEEDS, by Sidney M. Harmon. U. S. National Advisory Committee for Aeronautics. Mar 1951. 29p diagr, tables Mi $2.00, Ph $3.75. PB 103105

The method of relating the solution of a flow field to the solution of a simpler or known boundary-value problem is extended, subject to edge corrections for finite plan forms, to the most general type of prescribed boundary conditions on a wing in the linearized potential field at subsonic and supersonic speeds. The general procedure for determining edge corrections is given and specific "correspondence formulas" are developed for rectangular wings at subsonic and supersonic speeds for cases that do not require the solution of an integral equation. NACA TN 2303.

FORCE AND PRESSURE COEFFICIENTS UP TO MACH NUMBER 0.87 ON THE GOLDSTEIN ROOF-TOP SECTION 1442/1547, by H. H. Pearcey and J.A.

Beavan. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1946. 25p diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 102849

1. Mach number - Effect - Gt. Brit. 2. Airfoils, Low drag - Pressure distribution - Gt. Brit. 3. Wind tunnel tests - Gt. Brit. 4. Gt. Brit. National Physical Laboratory, Aerodynamics Division 5. ARC RM 2346.

Cover date is 1950. S.O. Code no. 23-2346.

GENERALIZATION OF BOUNDARY-LAYER MOMENTUM-INTEGRAL EQUATIONS TO THREE-DIMENSIONAL FLOWS INCLUDING THOSE OF ROTATING SYSTEMS, by Artur Mager. U. S. National Advisory Committee for Aeronautics. Mar 1951. 47p diagrs, graphs Mi $2.50, Ph $6.25. PB 103107

Boundary-layer equations for application in three-dimensional flows are developed. With the use of a fixed volocity profile and an empirical friction law an approximate solution in closed integral form is obtained for a generalized boundary-layer momentum-loss thickness and flow deflection at the wall in the turbulent case. A numerical evaluation of this solution carried out for data obtained in a curving nonrotating duct shows a fair quantitative agreement with the measured values. NACA TN 2310.

HANDLING TESTS ON THE CURTISS H-75, AND COMPARATIVE AILERON TESTS ON THE CURTISS H-75, SPITFIRE AND GLOSTER F.5/34, by M. B. Morgan, D. E. Morris and F. J. Bigg. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1940. 33p photos, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.40. PB 102854

1. Airplanes - Tests - Gt. Brit. 2. Ailerons - Tests - Gt. Brit. 3. Curtiss H-75 (Airplane) 4. Spitfire (Airplane) 5. Gloster F.5/34 (Airplane) 6. H-75 (Airplane) 7. F.5/34 (Airplane) 8. Gt. Brit. Royal Aircraft Establishment, Farnborough, England 9. ARC RM 2379.

Cover date is 1950. S.O. Code no. 23-2379.

INFLUENCE OF INERTIA IN MAKING SETTINGS ON A LINEAR SCALE, by William L. Jenkins, Louis O. Maas, Merritt W. Olson. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1950. 19p diagrs, tables Mi $1.75, Ph $2.50. PB 102916

For matching settings on a linear scale, added inertia as such has little or no practical effect on performance. Inertia in combination with backlash tends slightly to increase adjusting time, but the overall effect is relatively minor. When heavy friction is present, adding inertia tends to compensate for the deleterious effects of the friction to some extent. Combined inertia-plus-friction does not change the optimal ratio of one or two inches of pointer movement for one complete turn of the knob. With combined inertia-plus-friction present, the larger knob diameters are somewhat superior to diameters smaller than two inches, both with normal tolerance and with severe tolerance requirements. Contract no. W33-038-ac-22561 with Lehigh University. For earlier report see AAF TR 5968. AAF TR 6038.

LIFT AND PITCHING DERIVATIVES OF THIN SWEPTBACK TAPERED WINGS WITH STREAMWISE TIPS AND SUBSONIC LEADING EDGES AT SUPERSONIC SPEEDS, by Frank S. Malvestuto, Jr. and Dorothy M. Hoover. U. S. National Advisory Committee for Aeronautics. Feb 1951. 46p diagrs, graphs Mi $2.50, Ph $6.25. PB 102964

Theoretical approximations to the static-pitching derivative C_{m_α}, the lift-due-to-pitching derivative C_{L_q}, and the damping-in-pitch derivative C_{m_q} were derived for a series of sweptback tapered wings. The lift-curve slope C_{L_α} has been included for completeness. The results are valid for a range of Mach number for which the leading edge is subsonic and the trailing edge, either supersonic or subsonic provided the trailing-edge Mach lines no not intersect the leading edge of the wing. Design curves are presented which permit rapid estimations of the derivatives for given values of aspect ratio, taper ratio, Mach number, and leading-edge sweep. NACA TN 2294.

NOTES ON THE TURNING PERFORMANCE OF THE SPITFIRE AS AFFECTED BY ALTITUDE AND FLAPS, by M. B. Morgan and D. E. Morris. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1941. 15p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 102851

Turning performance calculations for the Merlin XX Spitfire at heights from 20,000 to 35,000 ft. show that a rapid deterioration in manoeuvrability is inevitable as the ceiling is approached, and that this is accentuated by high wing loading even if the engine power is increased with wing loading to maintain a constant ceiling. Cover date is 1950. S.O. Code no. 23-2349. ARC RM 2349.

PROPOSED LANDING GEAR DROP TEST PROGRAM FOR NOSE LANDING GEAR OF THE F-84E REPUBLIC AVIATION CORPORATION, by John F. Ceccarelli. Electrol, Inc., Kingston, N. Y. Oct 1949. 12p diagr, graph, table Mi $1.75, Ph $2.50. PB 103027

Information necessary for conducting jig drop tests on the nose landing gear of the F-84E fighter is presented. A proposed schedule of drop heights, attitude, and load factor is included. This procedure simulates actual field service maintenance of the F-84E fighter. Report 107.

STRESSES IN A STIFFENED CIRCULAR CYLINDER UNDER CONCENTRATED AXIAL LOADS, by D. C. Allen. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jan 1946. 10p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 102856

Solutions for the stress distribution in a long cylindrical shell of circular cross-section subjected to axial loads at four longerons have been obtained for two symmetrical loading cases - tension and bending action. From these any symmetrical loading condition can be deduced. The solution is in the form of an infinite series, but convergence is rapid except close to the root, and even when large numbers of terms are required the difficulty of computation of the higher terms is not great. The calculated distri-

bution for a particular case has been compared with some test results on a non-circular fuselage, and general agreement obtained. Cover date is 1950. S.O. Code no. 23-2405. ARC RM 2405.

THEORETICAL AND EXPERIMENTAL EFFECT OF SWEEP UPON THE STRESS AND DEFLECTION DISTRIBUTION IN AIRCRAFT WINGS OF HIGH SOLIDITY. PART 3: EXPERIMENTAL INVESTIGATION OF THE EFFECT OF SWEEP UPON THE STRESS AND DEFLECTION DISTRIBUTION IN CANTILEVER PLATES OF CONSTANT CHORD AND THICKNESS, by Harold M. Degroff. California Institute of Technology, Pasadena, Calif. Oct 1950. 147p photos, diagrs, graphs (8 fold), fold table Mi $5.75, Ph $18.75. PB 102747

This report deals with the experimental test program which will be correlated with the theoretical studies presented in Parts I and II of AF-TR 5761. This report was prepared by the Guggenheim Aeronautical Laboratory of the California Institute of Technology under AF Contract no. W33-038-ac-16961 during the period from April 1947 to June 1949. See PB 102745-PB 102746, PB 102748 for Parts 1-2,4. AAF TR 5761, Part 3.

THEORETICAL LIFT AND DAMPING IN ROLL AT SUPERSONIC SPEEDS OF THIN SWEPTBACK TAPERED WINGS WITH STREAMWISE TIPS, SUBSONIC LEADING EDGES, AND SUPERSONIC TRAILING EDGES, by Frank S. Malvestuto, Jr., Kenneth Margolis, and Herbert S. Ribner. U. S. National Advisory Committee for Aeronautics. Feb 1949. 19p diagrs, graphs Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.20. PB 103085

On the basis of linearized supersonic-flow theory, generalized equations were derived and calculations made for the lift and damping in roll of a limited series of thin sweptback tapered wings. Results are applicable to wings with streamwise tips and for a range of supersonic speeds for which the wing is wholly contained between the Mach cones springing from the wing apex and from the trailing edge of the root section. A series of design curves are presented which permit rapid estimation of the lift-curve slope C_{L_α} and damping-in-roll derivative C_{l_p} for given values of aspect ratio, taper ratio, Mach number, and leading-edge sweep. Cover date is 1950. NACA Report 970.

VIBRATORY STRESSES IN PROPELLERS OPERATING IN THE FLOW FIELD OF A WING-NACELLE-FUSELAGE COMBINATION, by Vernon L. Rogallo, John C. Roberts, and Merritt R. Oldaker. U. S. National Advisory Committee for Aeronautics. Mar 1951. 27p photos, diagrs, graphs, table Mi $2.00, Ph $3.75. PB 103052

An investigation has been made to determine the first-order vibratory stresses induced in propellers of conventional design when rotating in the flow field of a wing-nacelle-fuselage combination, and to thus enable careful evaluation of the steps essential to the prediction of these stresses. Comparisons are made of the oscillating air loads obtained from calculations based on steady-state propeller theory with those obtained from experimental wake-survey results. Comparisons are also made of computed stress distributions obtained by use of an existing method of computation with those obtained from measured results. NACA TN 2308.

Instruments

BRIGHTNESS LEVELS OF THREE INSTRUMENT LIGHTING SYSTEMS USED BY PILOTS FLYING AT NIGHT, by E. L. Cole, B. B. McIntosh, W. F. Grether. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1950. 20p photo, graphs, tables Mi $1.75, Ph $2.50. PB 102915

Information obtained from twelve pilots flying a C-47 aircraft at night using three different instrument lighting systems is presented. These systems were: (1) Red Flood. (2) Indirect Red, and (3) Ultra-Violet. Brightness levels used by the pilots were recorded for the three systems under varying flying conditions. These conditions were (1) normal night flying, (2) night instrument (maximum), and (3) minimum brightness necessary for safe flight. For normal conditions the lowest brightness level used occurred under Red Flood and highest under Indirect Red. At minimum levels Indirect Red was lowest followed by Ultra-Violet and Red Flood. At maximum levels (night instrument condition) Red Flood was highest, Indirect Red next and Ultra-Violet the lowest although this position of Ultra-Violet represented the maximum available brightness range for this system. AAF TR 6031.

DIAL READING PERFORMANCE AS RELATED TO ILLUMINATION VARIABLES. III: RESULTS WITH SMALL DIALS, by S.D.S. Spragg and M. L. Rock. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1950. 10p graphs, tables Mi $1.25, Ph $1.25. PB 102914

This experiment is a repetition, with different stimulus materials, of an experiment on the speed and accuracy of reading high contrast photographic reproductions of instrument dials. The earlier study has used 2.8 inch diameter dials with a coarse (100 x 10) scale. The present experiment used a 1.4 inch dial with a relatively fine scale (100x1). The present results corroborate and give added generality to the previous finding that for dial reading performance there is a critical brightness level in the region of 0.02 to 0.05 foot-lamberts, below which performance suffers marked decrement as brightness is decreased and above which increases in brightness produce but slight increments in performance. Contract no. W33-038-ac-18317 with University of Rochester. For parts 1-2 see PB 95565 and PB 96236. AAF TR 6040.

EFFECT OF AMPLITUDE OF APPARENT VIBRATION, BRIGHTNESS, AND TYPE SIZE ON NUMERAL READING, by M. N. Crook, G. S. Harker, A. C. Hoffman, J. L. Kennedy. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1950. 58p graphs, tables Mi $2.75, Ph $7.50. PB 102917

Performance on a simple addition task involving the reading of printed numerals at 14 inches from the eye position was investigated under various conditions of brightness, type size, and amplitude of apparent vibration. The vibration was introduced by rotating prisms at a frequency of 1050 cycles per minute. When the factors were varied singly, neither

time nor error scores were found to be significantly impaired by decrease of brightness to 0.05 foot-lamberts, decrease of type size to 6 point, or increase of amplitude to 0.02 inch. But two or three of these values in combination impaired scores from 0 to over 1000%. Evidence from earlier experiments in the series is reviewed, showing that interactions may occur with other aspects of the visual field such as vibration frequency and typographical spacing, and also with non-visual factors such as difficulty and unfamiliarity of the task. AAF TR 6246.

EFFECTS ON LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A B-29 AIRPLANE OF VARIATIONS IN STICK-FORCE AND CONTROL-RATE CHARACTERISTICS OBTAINED THROUGH USE OF A BOOSTER IN THE ELEVATOR-CONTROL SYSTEM, by Charles W. Mathews, Donald B. Talmage, and James B. Whitten. U. S. National Advisory Committee for Aeronautics. Feb 1941. 32p photos, diagrs, drawings, graphs, tables Mi $2.25, Ph $5.00. PB 102886

The longitudinal stability and control characteristics of a B-29 airplane have been measured with a control-surface booster incorporated in the elevator-control system. The measurements were obtained with the booster operating to provide various control-force gradients and various maximum rates of control motion. Results are presented which show the effect of these booster parameters on the handling qualities of the test airplane. NACA TN 2238.

FLIGHT INVESTIGATION OF THE VARIATION OF STATIC-PRESSURE ERROR OF A STATIC-PRESSURE TUBE WITH DISTANCE AHEAD OF A WING AND A FUSELAGE, by William Gracey and Elwood F. Scheithauer. U. S. National Advisory Committee for Aeronautics. Mar 1951. 23p photos, diagr, graphs Mi $2.00, Ph $3.75. PB 103051

Flight calibrations of the static-pressure error of a static-pressure tube located 1/4 to 2 chords ahead of the wing tip of a trainer airplane and 1/2 to 1 1/2 body diameters ahead of the fuselage and 1 chord ahead of the wing tip of a fighter airplane are presented. Calibrations were obtained over an indicated speed range from stall to speeds not exceeding 265 miles per hour. NACA TN 2311.

INSPECTION OF TWO GOODYEAR PLOTTING BOARDS FOR USE IN AC&W CENTERS, by Julien M. Christensen. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1950. 5p Mi $1.25, Ph $1.25. PB 103003

1. Instruments, Aeronautical 2. Plotters, Aircraft 3. Plotting boards 4. Plotting equipment 5. Goodyear Aircraft Company, Akron, Ohio 6. AAF TSEAA MR 694-24B.

For earlier report see AAF TSEAA MR 694-24A. See also PB 81415 for results of first inspection.

RUDDER CONTROLS, MODEL C124A, by W. E. Dager and F. Strible. Douglas Aircraft Co., Inc., Long Beach, Calif. Sep 1949-Aug 1950. 459f drawings, diagrs, graphs Mi $9.00, Enl Pr $60.00. PB 103191

Engineering data are presented for the rudder control system of the Douglas C-124A four-engine transport. The rudder control surface consists of the rudder and rudder flying tab. The tab is deflected by the pilot's effort and the airload created by the deflected tab actuates the rudder. The flying tab hinge moment developed by the pilot's effort is less than the aerodynamic hinge moment; therefore, the pilot effort is the design condition. Design details, load conditions, and test results are included. Report L.B. 10360 and revisions, Aug 28, 1950.

STUDY AND DEVELOPMENT OF EQUIPMENT FOR SIMULATING BLIND FLYING. FINAL REPORT ON CONTRACT N7ONR-37003, by R. Fitzpatrick and H. C. Knutson. American Institute for Research, Pittsburgh, Pa. Jun 1949. 36f photos, drawings, diagr, table Mi $2.25, Enl Pr $6.25. PB 103194

An investigation was made to determine the present effectiveness and potential improvements in physical characteristics and usage of all systems employed to simulate blind flying to enable the pilot to practice instrument flight without distraction by external cues. The advantages and limitations of two stage systems, employing two antagonistic light filters, hood systems, louver systems, and single stage systems using one sharp cut-off filter are discussed. The card or shield system, cardboard beak system, canopy hood system, and regular blue amber system are considered satisfactory, the regular blue-amber being considered the most effective. The physical characteristics of the blue and amber filter materials and usage and maintenance practices are described. Emphasis is placed on the need for understanding by pilots of the functioning and limitations of the equipment. SDC Flight section Project 6-BA. SDC 37003-5.

THEORETICAL METHOD OF DETERMINING THE CONTROL GEARING AND TIME LAG NECESSARY FOR A SPECIFIED DAMPING OF AN AIRCRAFT EQUIPPED WITH A CONSTANT-TIME-LAG AUTOPILOT, by Ordway B. Gates, Jr., and Albert A. Schy. U. S. National Advisory Committee for Aeronautics. Mar 1951. 38p graphs, table Mi $2.25, Ph $5.00. PB 103082

A method is presented for determining the control gearing and time lag necessary for determining a specified damping of the motions of an aircraft equipped with an autopilot having constant-time-lag characteristics. The method is applied to a typical present-day airplane equipped with an autopilot sensitive to yawing acceleration. The types of motion predicted for this airplane-autopilot system by this method are compared with the motions calculated by a step-by-step procedure. NACA TN 2307.

Engines and Propellers

EFFECT OF HEAT AND POWER EXTRACTION ON TURBOJET-ENGINE PERFORMANCE. IV: ANALYTICAL DETERMINATION OF EFFECTS OF HOT-GAS BLEED, by Stanley L. Koutz. U. S. National Advisory Committee for Aeronautics. Mar 1951. 43p graphs Mi $2.50, Ph $6.25. PB 103053

Generalized working charts are presented with which the performance of a turbojet engine operating with tail-pipe gas bleed can be determined. From these generalized working charts, the performance of an engine operating with tail-pipe gas bleed at several typical flight conditions and modes of engine operation is calculated. A method of determining the

performance of a turbojet engine with turbine-inlet bleed from the performance with compressor-outlet bleed is also given. For parts 1-3 see PB 100749, 101383, 101954. NACA TN 2304.

ICING-PROTECTION REQUIREMENTS FOR RECIPROCATING-ENGINE INDUCTION SYSTEMS, by Willard D. Coles, Vern G. Rollin, and Donald R. Mulholland. U. S. National Advisory Committee for Aeronautics. Jun 1949. 27p photos, diagrs, graphs Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.20. PB 103086

The results were obtained from laboratory investigations of carburetor-supercharger combinations, wind-tunnel investigations of air scoops, multicylinder-engine studies, and flight investigations. Characteristics of the three forms of ice, impact, throttling, and fuel evaporation, were studied. The effects of several factors on the icing characteristics were also studied and included (1) atmospheric conditions, (2) engine and air-scoop configurations, including light-airplane systems, (3) type of fuel used, and (4) operating variables, such as power condition, use of a manifold pressure regulator, mixture setting, carburetor heat, and water-alcohol injection. In addition, ice-detection methods were investigated and methods of preventing and removing induction-system ice were studied. Recommendations are given for design and operation with regard to induction-system icing. Cover date is 1950. NACA Report 982. Also TN 1993

Aerodynamics

EFFECT OF AN INCREASE IN ANGLE OF DEAD RISE ON THE HYDRODYNAMIC CHARACTERISTICS OF A HIGH-LENGTH-BEAM-RATIO HULL, by Walter E. Whitaker, Jr., and Paul W. Bryce, Jr. U. S. National Advisory Committee for Aeronautics. Feb 1951. 34p photos, diagrs, graphs, tables Mi $2.25, Ph $5.00. PB 102943

An investigation was made in Langley tank no. 1 to determine the effects of increasing the angle of dead rise on the hydrodynamic performance of a flying-boat hull having a length-beam ratio of 15. The hydrodynamic qualities determined were longitudinal stability during take-off and landing, spray characteristics, and take-off performance in smooth water and landing behavior in waves. The results of this investigation indicate an over-all improvement in the hydrodynamic characteristics including a large reduction in the accelerations and motions in waves. NACA TN 2297.

K TEORII KRILA KONECHNOGO RAZMAHA V SVERHZVOOKOVOM POTOKE (ON THE THEORY OF A WING OF FINITE ASPECT RATIO IN SUPERSONIC FLOW), by S. V. Falkovich. 1947. 18f diagrs (Text in Russian and English) Mi $1.75, Enl Pr $3.75. PB 102975

1. Flow, Supersonic - Russia 2. Wings - Aspect ratio - Russia 3. Wings - Velocity distribution - Russia 4. Wing theory - Russia 5. Brown University, Graduate Division of Applied Mathematics 6. AAF T-2 T/1215-1A 7. GDAM A-9-T-34.

Translated from Prikladnaiia matematika e mechanika XI 1947 p. 391-394 by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9-T-34.

K VOPROSOO O TONKOM TREOOGOLNOM KRILE, DVIJOOSCHEMSYA SO SVERHZVOOKOVOY SKOROSTYOU (ON THE PROBLEM OF A THIN TRIANGULAR WING MOVING WITH SUPERSONIC VELOCITY), by M. I. Gurevich. 1947. 10f diagr (Text in Russian and English) Mi $1.25, Enl Pr $2.50. PB 102978

1. Wings, Triangular - Russia 2. Wing theory - Russia 3. Flow, Supersonic - Russia 4. Mach number - Effect - Russia 5. Brown University. Graduate Division of Applied Mathematics 6. AAF T-2 T/1216 7. GDAM A-9-T-35.

Translated from Prikladnaiia matematika e mechanica XI 1947 p. 395-396 by Brown University under Contract W-33-038-ac-15004 (16351). GDAM A-9-T-35.

KRYLO PRIAMOUGOL'HOI FORMY V PLANE V SVERKHZVUKOVON POTOKE (RECTANGULAR PLATFORM WING IN A SUPERSONIC FLOW), by L. A. Galin. 1947. 29f diagr (Text in Russian and English) Mi $2.00, Enl Pr $5.00. PB 102981

1. Flow, Supersonic - Russia 2. Wings, Rectangular - Russia 3. Wing theory - Russia 4. AAF T-2 T/1217-1A.

Translated from Prikladnaiia matematika e mechanika XI 1947 p. 465-474.

O KRILE KONECHNOGO RAZMAHA V SVERHZVOOKOVOM POTOKE (REMARKS ON THE WING OF FINITE ASPECT RATIO IN SUPERSONIC FLOW), by L. A. Galin. 1937. 17f diagr (Text in Russian and English) Mi $1.75, Enl Pr $3.75. PB 102977

1. Wings - Aerodynamics - Russia 2. Flow, Supersonic - Russia 3. Brown University. Graduate Division of Applied Mathematics 4. AAF T-2 T/1218 5. GDAM A-9-T-37.

Translated from Prikladnaiia matematika e mechanica XI 1947 p. 383-386 by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9-T-37.

OBRATNOYE VLIYANIYE POGRANICHNOGO SLOYA NA RASPREDELENIYE DAVLENIYA PO POVERHNOSTI TELA, OBTEKAYEMOGO REALNOI ZHIDKOSTU (REACTION OF THE BOUNDARY LAYER ON THE DISTRIBUTION OF PRESSURE OVER THE SURFACE OF A BODY IN A FLOW OF REAL FLUID), by L. G. Loytsiansky. Mar/Apr 1947. 36f diagrs (Text in Russian and English) Mi $2.25, Enl Pr $6.25. PB 102984

1. Boundary layer - Theory - Russia 2. Wings profiles - Russia 3. Wings - Pressure distribution - Russia 4. Wing theory - Russia 5. AAF T-2 T/1210-1A 6. GDAM A-9-T-28.

Translated from Prikladnaiia matematika e mechanika XI 1947 no. 2, p. 203-214 by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9-T-28.

THREE-DIMENSIONAL COMPRESSIBLE LAMINAR BOUNDARY-LAYER FLOW, by Franklin K. Moore. U. S. National Advisory Committee for Aeronautics. Mar 1951. 38p diagrs Mi $2.25, Ph $5.00. PB 103048

The equations for three-dimensional compressible laminar boundary-layer flow with variable viscosity and heat conductivity are simplified by introducing a two-component vector potential and by applying certain transformations. Flow over flat plates with arbitrary leading-edge contours is discussed. In

cases involving conical potential flows, the Blasius type of similarity is shown to apply along rays from the apex. NACA TN 2279.

USE OF AN UNCALIBRATED CONE FOR DETERMINATION OF FLOW ANGLES AND MACH NUMBERS AT SUPERSONIC SPEEDS, by Morton Cooper and Robert A. Webster. U. S. National Advisory Committee for Aeronautics. Mar 1951. 28p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 103111

Experimental pressures obtained over the forward part of a body of revolution at a Mach number of 1.59 and a Reynolds number of 1.04×10^6 per foot have been compared with theory and analyzed to indicate the accuracy with which an uncalibrated cone can be used as a Mach number and flow-angle indicator at supersonic speeds. NACA TN 2190.

VOZMOOSCHONNOYE DVIJENIYE VOZDOOHA PRI VIBRATSIYAH KRILA DVIJOOSCHEGOSIA SO SVERHZVOOKOVOI SKORASTIYOU (DISTURBED MOTION OF AIR CAUSED BY VIBRATIONS OF A WING MOVING AT SUPERSONIC SPEED), by E. A. Krasilschikova. 1947. 42f diagrs Mi $2.50, Enl Pr $7.50. PB 102982

1. Flow, Supersonic - Russia 2. Wings - Vibration - Russia 3. Wing theory - Russia 4. AAF TR 102-AC 49/4-34 5. GDAM A-9-T-24.

Translated from Prikladnaiia matematika e mechanika XI 1947 p. 147-164 by Brown University under Contract W33-038-ac-15004 (16351). GDAM A-9-T-24.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

PREVENTION OF POLLUTION OF RIVERS AND OTHER WATERS: REPORT OF THE RIVERS POLLUTION PREVENTION SUB-COMMITTEE OF THE SCOTTISH WATER ADVISORY COMMITTEE. Gt. Brit. Dept. of Health for Scotland. 1950. 37p fold. map Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 102843

1. Water - Pollution - Scotland 2. Rivers - Pollution - Scotland.

Cmd. 8111.

REPORT OF THE WATER POLLUTION RESEARCH BOARD, WITH THE REPORT OF THE DIRECTOR OF WATER POLLUTION RESEARCH FOR THE YEAR 1949. Gt. Brit. Dept. of Scientific and Industrial Research. Water Pollution Research Board. 1950. 57p photos, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 102790

1. Water - Pollution - Gt. Brit. 2. Sewage - Purification - Gt. Brit. 3. Trade waste - Purification - Gt. Brit.

S.O. Code no. 47-72-0-49.

REQUIRED REGULATED FLOW: METHOD FOR COMPUTING THE NECESSARY AMOUNT OF STORM WEATHER FLOW IN A COMBINED SEWER SYSTEM TO BE DIVERTED FOR DISPOSAL, WHEN DISCHARGING THE SURPLUS INTO A STREAM, by Gunnar Akerlindh. 1950. 43p drawing, graphs Mi $2.50, Ph $6.25. PB 102930

On the basis of duration curves (distribution curves) for sewage flow, rain-water flow and stream run off and taking into account the qualities of the flows, the duration curve for initial water pollution due to surplus storm weather flow discharge is established with the aid of probability calculus. Required regulated flow ("the diversion factor") is determined, so that this pollution, having regard to the self-purification capacity of the recipient stream, may be considered permissible in various respects. A special solution — also illustrating the method by applying Swedish conditions in general — is presented, whereby the extensive probability calculations are carried through once and for all, for a certain climate area, and relative calculation values are determined for the quantities mentioned. Civil Engineering and Building Construction series Vol. 1, no. 11. Acta Polytechnica no. 58, 1950.

STRÖMUNGSGESETZ IN RAUHEN ROHREN. (LAWS OF FLOW IN ROUGH PIPES), by J. Nikuradse. Nov 1950. 60p photos, diagrs, graphs, tables Mi $2.75, Ph $7.50. PB 102594

An experimental investigation is made of the turbulent flow of water in pipes with various degrees of relative roughness. The pipes range in size from 25 to 100 millimeters in diameter and from 1800 to 7050 millimeters in length. Flow velocities permitted Reynolds numbers from about 10^4 to 10^6. The laws of resistance and velocity distribution were obtained as function of relative roughness and Reynolds number. Mixing length, as described by Prandtl's mixing-length formula, is discussed in relation to the experimental results. Translation from Verein Deutscher Ingenieure Forschungsheft 361. Beilage zu 'Forschung auf dem gebiete des Ingenieurwesens" Ausgabe B, Band 4, July/August 1933. NACA TM 1292.

MISCELLANEOUS

BRIGHTNESS AND POLARIZATION OF THE DAYLIGHT SKY AT ALTITUDES OF 18,000 TO 38,000 FEET ABOVE SEA LEVEL, by D. M. Packer and C. Lock. U. S. Naval Research Laboratory. Jul 1950. 63p photos, diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $1.75. PB 102599

The brightness and polarization of the daylight sky over Arizona and southern California were measured from B-29 aircraft while flying at altitudes of 18,000, 27,500, 34,000, and 38,000 feet above sea level. Comparison of the results with the Tousey-Hulburt theory of sky brightness showed that the theory agreed fairly well with the experimental data for all altitudes of observation, for all points in the sky more than 30° from the horizon and for scattering angles greater than about 40° from the sun, when an atmospheric attenuation coefficient of 0.017/km was assumed. The values of sky brightness observed at scattering angles within 30° of the sun indicated that large scattering particles were present in the atmosphere overhead at all altitudes of observation, including 38,000 feet. The measured values of sky brightness and polarization are presented graphically, plotted as functions of the angle between the sun and the observed point in the sky. NRL R 3713.